ATTITUDES, PERCEIVED BENEFITS AND BARRIERS, AND PREVALENCE OF SCHEDULING RECESS BEFORE LUNCH: A SURVEY OF INDIANA ELEMENTARY SCHOOL PRINCIPALS

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ABSTRACT

THESIS: Attitudes, Perceived Benefits and Barriers, and Prevalence of Scheduling Recess Before Lunch: A Survey of Indiana Elementary School Principals

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Historically, school administrators schedule recess immediately after lunch. Recent research, however, suggests a plethora of benefits if recess is scheduled *before* lunch (i.e., decreased plate waste, increased consumption of nutrients, and decreased discipline problems on the playground and in the lunchroom). Thus, the purpose of this study was to survey Indiana elementary principals to identify the practices, perceived benefits and barriers, and attitudes of elementary school principals toward scheduling recess before lunch in Indiana. Email addresses of Indiana principals were obtained from the Executive Director of the Indiana Association of State Principals. An anonymous, online survey was distributed in an individualized email to elementary principals whose lowest grade was 5th or less. Results were evaluated using frequencies (percent) and chi-square analyses. A total of 527 surveys were completed from the 1,392 emails that were successfully delivered (38% response rate). Results indicate 30.7% of elementary schools scheduled recess before lunch, with 69.3% scheduling recess after lunch. Major benefits of scheduling recess before lunch included: increased consumption of lunch, improved behavior in the cafeteria, and increased focus on consuming lunch. Major barriers preventing schools from scheduling recess before lunch were: need to revise the daily schedule, preservation of academic hours, and lack of staffing. There were no significant differences in the

scheduling of lunch and recess by geographic location, school nutrition region, enrollment, percent free or reduced lunch or type of school ($p > 0.05$). Based on the adjusted standardized residuals, there were significant differences when recess and lunch were scheduled based on the number of lunch periods offered, with schools offering one lunch period significantly more likely to schedule recess after lunch (AR= 2.4), while schools with two lunch periods more likely to schedule recess before lunch (AR= 2.6). The results of this study delineate the prevalence of scheduling recess before lunch in Indiana and helps identify benefits and barriers to this practice.

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CHAPTER 1

INTRODUCTION

Students in Indiana spend an average of seven hours per day, five days per week, and 180 days per year, at school (National Center for Education Statistics, 2008). This time is spent both in intellectual development and in the development of many life skills (deMarrais & LeCompte, 1995). While lunch and recess – two components of any elementary school day – may seem trivial, both are important to the social and intellectual development of a child (Ishii, Shibatam, Sato, & Oka, 2014). School lunch typically accounts for 25 to 30 minutes of the school day (United States Department of Agriculture Food and Nutrition Services [USDA FNS], 2012), while recess typically accounts for 30 minutes (Indiana Department of Education [IN-DOE], 2011). Together, lunch and recess account for approximately 180 hours of the school year.

The National School Lunch Program (NSLP) was established through the United States Department of Agriculture (USDA) to help ensure the health and well-being of students (Stallings et al., 2010). Approximately 60% of children purchase the school lunch offered through the NSLP (Farris et al., 2014). The lunches provided through the NSLP must provide 1/3 of the daily calorie rand nutrient recommendations for various age groups, and meet established guidelines for fruits, vegetables, protein, grains, and dairy (Kline, 2015). Nationwide, the NSLP serves over 30.5 million children daily (USDA FNS, 2012).

In 2016, a total of 586 schools and institutions in Indiana participated in the NSLP, serving an estimated 1 million meals (IN-DOE, 2017a). Research indicates students who consume the NSLP lunches consume significantly more vegetables, milk, and whole grains, resulting in a higher nutrient intake, when compared to students who bring their own lunches (Cullen, Watson, & Dave, 2011; Upton, Upton, & Taylor, 2012; Amin, Yon, Taylor, & Johnson, 2015; Cullen, Chen, Dave, & Jenson, 2015). Despite the fact that the NSLP has been shown to help students meet current nutrient recommendations, while concomitantly helping them establish healthy eating habits, schools continue to seek ways to reduce the plate waste associated with the school lunches (U.S. Department of Health and Human Services, 2016).

Recess during the school day is an integral part of a child's development (McIsaac, Kirk, & Kuhle, 2015). Recess provides short bouts of physical activity, which, along with healthy lifestyle behaviors, have resulted in positive effects on academic performance (Mahar, 2011; McIsaac, Kirk, & Kuhle, 2015). It has been estimated that up to 40% of children's daily physical activity takes place during recess (Ridgers, Stratton, & Fairclough, 2006). Recess has been associated with improvement in attention-to-task, increased health benefits, and increased self-esteem, all of which have a positive effect on the school day and curriculum (Mahar, 2011; Physical Activity Guidelines Committee, 2008; Janssen & LeBlanc, 2010). Nonetheless, only an estimated 51% of the nation's school districts requires recess during the school day (Lee, Burgeson, Fulton, & Spain, 2007). In Indiana, schools are required to allow at least 30 minutes for daily physical activity in the form of physical education or recess (IN-DOE, 2017b) to encourage a healthy life style and improved academic performance.

Typically, if school recess is offered, it is scheduled immediately after the lunch period. This practice has been associated with a reduced consumption of food (i.e., increased plate

waste) as children hurry to be “done” with their lunch so they can go outside and play (Price and Just, 2015). Several recent studies indicate moving recess before lunch not only reduces plate waste, but also results in many positive benefits that impact both students and the foodservice system, including a 54% increase in the consumption of fruits and vegetables (Price and Just, 2015), increased consumption of school lunches and improved behaviors in the lunchroom and classroom (Stohbehn, Stobehn, Lanningham-Foster, Litchfield, Scheidel, & Delger, 2016; Bergman, Buergel, Englund, & Femrite, 2004; Hunsberger, McGinnis, Smith, Beamer, & O’Malley, 2014; Price & Just, 2015). Additional documented benefits of scheduling recess before lunch include a calmer atmosphere in both the classroom and lunchroom; a decrease in discipline problems in the lunchroom, playground, and classroom; an improved learning atmosphere; and increased time for students to meet with the teacher before going to recess (The Montana Office of Public Instruction, 2003).

Despite these documented benefits of scheduling recess immediately before lunch, at present, little is known about what percent of our nation’s elementary schools actually follow this practice. In 2001, an estimated 4.6% of schools scheduled recess before lunch (Weschler, Brener, Kuester & Miller, 2001); in 2007, an estimated 10.4% of the nation’s schools followed this practice (Lee, Burgeson, Fulton, & Spain, 2007); and in 2012, it was reported that an estimated 37% of elementary schools across the nation scheduled recess before lunch (U. S. Department of Agriculture, 2012). Reported barriers that have prevented schools from scheduling recess before lunch have included lack of staffing for supervision in the lunchroom and playground, breaking of tradition, perceived behavior of the students, and the increased need for communication (Rainville, Wolf, Carr, 2006). Recently, however, the Missouri Department of Education reported that 60% of their elementary schools schedule recess before lunch

(Missouri Department of Health and Senior Services [MDHSS], 2016). When asked, the Indiana Department of Education indicated it is not known if/how many elementary schools in Indiana schedule recess before lunch. With the accumulating body of evidence indicating the benefits of recess before lunch, and with the dearth of information about this practice in Indiana, identifying the prevalence and impact of scheduling recess before lunch in elementary schools in Indiana is warranted.

Statement of Problem

When recess is scheduled after lunch, children tend to hurry through their meal to move on to recess, contributing to plate waste and a reduced nutrient intake (Price et al., 2015). Scheduling recess before lunch, however, has been shown to have many positive benefits, including a decrease in plate waste, increase in consumption of fruits and vegetables, and better overall student behavior (Bergman et al., 2004; Hunsberger et al., 2014; Price et al., 2015). Despite these benefits, the most recent national estimate available indicated only 10.4% of elementary schools in the United States schedule recess before lunch (Lee et al., 2007), although the prevalence has been reported to be as high as 60% in Missouri (MDHSS, 2016). At present, the number of schools in Indiana that schedule recess before lunch is unknown (S. Kenworthy, personal communication, March 15, 2017). Identifying how many elementary schools in Indiana offer recess before lunch, and identifying attitudes toward, and perceived benefits and barriers to this practice, will provide evidence to help school district personnel make a data informed decision about the placement of lunch and recess in their elementary schools.

Purpose

The purpose of this study is to identify the practices, perceived benefits, and attitudes of elementary school principals toward scheduling recess before lunch in Indiana.

Research Questions

The following research questions will be examined in this study:

1. What percentage of elementary schools in Indiana schedule recess before lunch?
2. What factors prevent school administrators from scheduling recess before lunch?
3. If a school has scheduled recess before lunch:
    a. Were any barriers encountered when this change was made?
    b. How were any barriers removed or reduced?
    c. What effects (positive/negative) have been noted in the students because of this change?
    d. What effects (positive/negative) have been noted in the staff because of this change?
    e. Would they recommend that other schools offer recess before lunch?
4. Are there differences in responses based on the:
    a. Location of the elementary school (i.e., rural, town, suburban, and urban)?
    b. School Nutrition Association district?
    c. Designation of public versus private elementary schools?
    d. Percentage of students on free and reduced lunch?

Rationale

Despite the fact that scheduling recess before lunch has been associated with decreased plate waste, increased consumption of school lunches; improved behaviors in the lunchroom and classroom (Stohbehn et al., 2016; Bergman et al., 2004; Hunsberger et al., 2014; Price et al., 2015); a 54% increase in the consumption of fruits and vegetables (Price and Just, 2015); a calmer atmosphere in both the classroom and lunchroom; a decrease in discipline problems in the lunchroom, playground, and classroom; an improved learning atmosphere; and increased time for students to meet with the teacher before going to recess (The Montana Office of Public Instruction, 2003), many schools still have not scheduled recess before lunch. Many barriers, such as staffing for supervision in the lunchroom and on the playground, the willingness of administrators, breaking of tradition, student behavior, and communication (Rainville, Wolf, & Carr, 2006), have kept schools from making this change. Information gained from successful schools that have implemented recess before lunch can be helpful for those who wish to schedule recess before lunch. By surveying Indiana schools, the number of schools that schedule recess before lunch can be established, barriers to those who have not changed can be found, benefits can be vocalized, and problems that occurred during transition can be discussed.

Assumptions

The researcher makes the following assumptions in the implementation of the study and in the interpretation of the data:

1. The study participants will understand the directions when completing the survey instrument;
2. The study participants will be answering the survey question honestly;

3. The responses obtained will be representative of all elementary schools in Indiana; and
4. The survey questions will adequately cover the scope and breadth of the barriers and benefits associated with the placement of recess.

Definitions

For the purpose of this study, the following definitions will be used:

1. **National School Lunch Program**: A federally funded program that provides schools with subsidies to provide balanced meals for public and non-profit private schools. To participate in this program, schools must follow specific guidelines on foods provided to receive reimbursement (Stallings et. al 2010).
2. **Elementary**: Elementary grades are defined as grades kindergarten through grade 6 (S. Kenworthy, personal communication, April 26, 2017).
3. **Plate waste**: The portion of edible food that is uneaten and thrown away from a meal (Buzby & Guthrie, 2002).
4. **High Poverty School**: A school with more than 75.0% of students eligible for free or reduced-price lunch (National Center for Education Statistics, 2017).
5. **Mid-High Poverty School**: A school with 50.1 to 75% of students eligible for free or reduced-price lunch (National Center for Education Statistics, 2017).
6. **Mid-Low Poverty School**: A school with 25.1 to 50% of students eligible for free or reduced-price lunch (National Center for Education Statistics, 2017).
7. **Low Poverty School**: A school with 25% or less of students are eligible for free or reduced-price lunch (National Center for Education Statistics, 2017).

Summary

The National School Lunch Program provides schools with the resources to serve nutritious meals to students, while recess provides a break from learning which in turn, improves academic performance. Although these benefits have been identified from contribution for the NSLP, other strategies need to be implemented as plate was in schools is a continued concern. Traditionally, recess has been scheduled immediately after lunch. Reversing the order by scheduling recess before lunch has shown to have many benefits including decreased plate waste, an improved learning atmosphere, less discipline problems in the lunchroom and playground, and increase in lunch consumption. Many barriers accompany the idea of this reverse order. Barriers that have been mentioned include staffing issues, resistance by faculty, and other scheduling issues. By bringing these barriers to the forefront and discussing the success other schools have had, more schools will be able to adapt to this schedule change.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this study is to identify the practices, perceived benefits, and attitudes of elementary school principals toward scheduling recess before lunch in Indiana. This chapter provides an overview of the literature to: 1) define the National School Lunch Program (NSLP) and the its legislation; 2) define nutrition's role in learning; 3) define recess's role in learning; 4) exhibit the evidence that duration and timing of lunch and recess have an effect in learning and nutrient consumption; 5) provide evidence of the benefits of scheduling recess before lunch; 6) provide perceived barriers that prevents a school from scheduling recess before lunch; and 7) define current lunch time and recess practices in schools in Indiana.

Background

The typical school day in Indiana is about 7 hours. School is in session 5 days per week for a total of 180 days per year (National Center for Education Statistics, 2008). School lunch typically accounts for 25 to 30 minutes of the school day (USDA FNS, 2012), while recess typically accounts for 30 minutes (IN-DOE, 2011). Together, lunch and recess account for approximately 180 hours of the school year. While lunch and recess may seem trivial, these time periods are important to the social and intellectual development of a child (Ishii, Shibatam, Sato, & Oka, 2014).

The National School Lunch Program

Schools are not required to serve lunch for students if the school does not participate in the National School Lunch Program (NSLP); however, schools are required to provide time to eat lunch in the form of either a packed lunch or time to travel off campus to consume lunch (S. Kenworthy, personal communication, March 15, 2017). Open campus lunch policies can be set at the state level by the board of education. If the state allows an open campus lunch, schools districts must decide if they are willing to grant their students that freedom (Miura, 2009). Schools participating in the NSLP must serve lunch between the hours of 10 A.M. and 2 P.M. Schools can request an exemption to this requirement if it is needed (U. S. Government Publishing Office, 2017).

The National School Lunch Act was initially approved by the 79th Congress in 1946 (Gunderson, 1971). The purpose of the NSLP was to serve as a measure of national security for the health and well-being of children in the United States (Stallings et al., 2010). To participate in the NSLP, schools must be public or nonprofit private schools or public or nonprofit private residential child care institutions, must provide free or reduced-cost meals to children who qualify, offer and serve meals that meet the minimum nutrition recommended standards, and meet the offer versus serve (OVS) provisions (Stallings et al., 2010). Participating schools receive cash subsidies and USDA foods from the USDA to serve during lunchtimes. In 2015, the NSLP cost the United States $11.7 billion in reimbursements and $1.3 billion in commodity costs (School Nutrition Association, 2015). According to the Indiana Department of Education IN DOE (2017a), as of June 2017, a total of 586 schools and other institutions in Indiana participate in the NSLP. Of these institutions, 292 are public schools, 172 are non-public schools, and the remainder include camps, boarding schools, and residential child care institutions.

Since the time of implementation, many revisions have been made to the NSLP. In the Healthy, Hunger-Free Kids Act of 2010 (HHFKA), the authority of the Secretary of Agriculture was increased over these programs. This bill gave the Secretary of Agriculture the power to set nutrition standards for the NSLP, the School Breakfast Program (SBP), and any foods sold on school grounds (National Conference of State Legislatures, 2011). This act led to the modernization of school nutrition guidelines. These guidelines are continually updated as new research emerges.

In 2018, the NSLP requires a daily serving of fruits with a minimum of ½ cup served per day, a daily serving of vegetables with a minimum of ¾ cup served per day with an additional requirement for dark green (1/2 cup per week), red and orange (3/4 cup per week), beans and peas (1/2 cup per week) and an increased quantity of combined fruits and vegetables. The USDA also requires a daily and weekly minimum requirement for meat, meat alternatives, and grains (1 serving per day). Fruits can be fresh, dried, frozen, or canned in light syrup, water or fruit juice. Vegetables may be fresh, canned, frozen, or can be dried in the case of beans, peas and legumes. Pasteurized, full-strength vegetable juice can also count as a serving of vegetables (Electronic Code of Federal Regulations, 2018). Only fat-free flavored or unflavored and low-fat (1%) unflavored milk can be offered as a part the NSLP. At least two different milk options must be available. Water can be offered but cannot be served in the place milk. Less than 10% of total calories can come from saturated fat and food products and ingredients used in school meals must have less than 0.5 grams of trans fat. There are 3 targets for sodium standards. Target 1 sodium standards include no more than 1230mg for grades K-5, no more that 1360mg for grades 6-8, and no more than 1420mg for grades 9-12. The USDA is working to implement lower sodium requirements (Electronic Cods of Federal Regulations, 2018. Target 2 includes no more

than 935mg for grades K-5, no more that 1035mg for grades 6-8, and no more than 1080 for grades 9-12.Targets for the years 2022-2023 include no more than 640mg of sodium for grades K-5, no more than 710mg for grades 6-8, and no more than 740mg for grades 9-12 (Electronic Code of Federal Regulations, 2018. Calorie ranges for grades K-5 are 550-650 calories, grades 6-8 range is 600-700 calories and grades 9-12 range is 750-850 calories All students purchasing a national school lunch are required to take either a serving of fruit or vegetables with their lunch, as per the "offer versus serve" (OVS) policy.

These provisions set by the USDA were meant to increase the student's consumption of nutrients at school, however, the government has experienced repercussions on the standards set, with claims that the NSLP increases plate waste and is unappetizing to students (Price & Just, 2013; Cohen et al., 2013; Thiagarajah, Getty, Johnson, Case & Herr, 2015). Through analyzing the methods of many different plate waste studies, Shanks, Banna, & Serrano (2017), found that most nutrition education programs did not decrease plate waste or only decreased plate waste in certain food groups, but, modifying lunchtime practices or the foods itself increased the consumption of foods, thus decreasing plate waste. The study also identified two research studies that indicated scheduling recess before lunch decreased plate waste. To aid in decreasing plate waste and increasing consumption of meals, the USDA FNS (2016) has recommended scheduling recess before lunch. In addition to decreasing plate waste, scheduling recess before lunch also improves behaviors in the lunchroom and classroom, decreases discipline problems in the lunchroom, playground, and classroom, and improves learning atmosphere (The Montana Office of Public Instruction, 2003; Stohbehn et al., 2016).

Recent Changes to the National School Lunch Program

In May of 2017, a memorandum to the NSLP was implemented that provides more flexibility on requirements such as whole grains, sodium, and low fat flavored milk. For whole grains, a school food authority exemption may be requested for schools that are having difficulty in providing students with whole grains to be compliant with current requirements of the NSLP (Kline, 2017). Previously, the NSLP had established certain sodium targets for schools to reach each year in an effort to decrease the sodium consumption among school aged children. Target 1 was to be met beginning July 2014, Target 2 July 2017, and Target 3 July 2022 (U. S. Department of Agriculture, 2016b). Each target has descending sodium limits for meals depending on grade level. With this memorandum, schools must at least meet the sodium restrictions of Target 1 (Kline, 2017). The FNS states they will continue to promote sodium reduction of school meals. In regards of low-fat flavored milk, this memorandum allows schools to offer low fat or 1% flavored milk instead of the original restriction of only offering fat-free flavored milk under certain conditions. If a school has experienced a decrease in milk sales, significant waste of milk, negative feedback from parents and students of the fat-free flavored milk, they may offer low-fat flavored milk (Kline, 2017). The flexibility of the flavored milk rule is in attempt to increase milk consumption of school-aged children.

Variation in School Health Policies

The location of the school is important to identify in the fact that nutrition and health policies may differ in location (Caspi, Davey, Nelson, Larson, Kubik, Coombes, & Nanney, 2015; Nanney, Davey, & Kubik, 2013), as well as differences in the food environment such as proximity to convenience stores, restaurants, or snack stores (Sturm, 2007). Between 2008 and 2012, the prevalence of healthy eating practices declined in city schools but remained constant in

suburb and rural/town schools (Caspi et al., 2015). Variations in school health policies can also occur in differing categories of schools, such as public versus private. Catholic, private, and smaller school tend to have less strict health policies than larger public schools (Balaji, Brener, & McManus, 2006). Whether a child is on free or reduced-price lunch may impact the amount of school lunch eaten by the student (Stookey, 2015). If a school has a large number of students on free or reduced-price lunch, they may need different nutrition strategies than those with a low amount of students on free or reduced-price lunch. Indiana is divided into nine School Nutrition Association districts and chapters (Indiana School Nutrition Association, 2017). Each chapter and district meets to set nutrition goals for the academic year. Nutrition goals could potentially differ for each district and chapter.

Summary

In summary, the National School Lunch Program aids schools in providing nutritious lunches to students. The program has been in place since 1946 and has experienced many changes in the past years. Currently, the USDA has set standards for servings of fruit, vegetables, meat, meat alternatives, milk, sodium, trans fat, saturated fat and calories for specific grade levels. With more focus on providing specific amounts of food groups, many students have complained of the palatability of the meals and food waste has increased in schools across the country all while the childhood obesity epidemic continues. These factors call for other approaches to improving nutrition in schools. Schools may have varying health policies depending on their location, enrollment, and poverty level. It is important to evaluate these factors when investigating a school's strategies on the promotion of nutrition.

Nutrition and Learning

The consumption of a nutritious school lunch has been shown to have positive benefits in a child's learning and concentration in the classroom (Golley, Baines, Basset, Wood, Pearce, & Nelson, 2010; Correa-Burrows, Burrows, Blanco, Reyes, & Gahagan, 2016). When healthier school meals were promoted through intervention, concentration and engagement of teacher to pupil interactions were increased from 73.6% to 82.9% (Golley et al., 2010). Students who reported regularly consuming a diet high in fat, sugar, salt and calories had significantly lower performance in Language and Mathematics and lower overall GPA compared to those whose diets were categorized as being "fair" or "healthy" (Correa-Burrow et al., 2016). IQ scores in children have been found to be higher among those who consumed the recommended number of breads and cereals and those who consumed fish weekly (Theodore et al., 2009).

Students who consume a low-quality diet, consisting of high intakes of fat and refined sugars and a low intake of fruits and vegetables perform inferior academically compared to those who consume a higher quality diet consisting of high intakes of fruits, vegetables, and whole grains (Florence, Asbridge, & Veugerkers, 2008; Berezowitz, Yoder, & Schoeller, 2015). Students who consumed higher amounts of sugar-sweetened beverages performed lower in math and reading scores than students who had higher consumption of milk (Edwards, Mauch, & Winkelman, 2011). A school garden intervention increased fruit and vegetable consumption, which, in turn, increased academic outcomes in science and math scores (Berezowitz et al., 2015).

Micronutrients and Learning

Consumption of high quality diets that include consumption of fruits, vegetables, and dairy also provide the micronutrients needed to develop proper cognition (Khor & Misra, 2012).

Common micronutrient deficiencies that may be linked to proper cognition include iron, zinc, iodine, and vitamin A. Children with anemia are at an academic disadvantage unless intervention is performed (Taras, 2005). Iron is needed for the delivery of oxygen to brain cells which is needed for nerve cell activity (Manger, Winichangoon, Pongchchareon, Gorwachirapon, Boonpraderm, Mckenzie, Bailey, & Wasantwisut, 2004). Research has shown that iron supplementation has improved concentration, and attention in students ages 6 years and older (Falkingham, Abdelhamid, Curtis, Fairweather-Tait, Louise, & Hooper, 2010). Lozoff and Georgieff (2006) observed that when iron supplementation was given to groups that were iron deficient, IQ scores increased by 2.5 points.

Supplementing the diet with zinc has provided conflicting results, with one study demonstrating that zinc supplementation increases attention and reasoning in school-aged children (Black, 2003). Higher intakes of zinc and B vitamins were associated with increased scores on memory tests compared to student who has lower intakes of zinc and B vitamins (Gewa, Robert, Nimrod, Whaleya, Sigmana, Murphy, Gail, & Newmann, 2009). Increased zinc and magnesium content in female student's hair has also been shown to be associated with higher academic records (Wang, Li, Wang, Shi, & Lee, 2008). When given vitamin A, vitamin D, vitamin E, vitamin B_2, pantothenic acid, phosphorous, and zinc fortified milk, students performed better in languages, mathematics, ethics, and physical performance over a six-month period compared to those who were given unfortified milk (Wang et al., 2017). The NEMO Study Group (2007) found that verbal learning and memory were improved in children given a beverage supplement containing iron, zinc, folate, vitamin A, vitamin B_6, vitamin B_{12}, vitamin C, docosahexanoic acid (DHA), and eicosapentaenoic acid.

Foods that Negatively Impact Learning

Smith, Leekam, Ralph, and McNeill (1988) reported that certain components of meals may have different behavioral effects on students such as meals higher in sugar and starch slowed reaction times to visual stimuli. Lloyd, Green, and Rogers (1994) tested behavioral effects of lunches by providing different compositions of macronutrients. Results indicated the macronutrient composition of the lunches associated with the best reaction time, cognitive performance, and mood included meals that contained medium-fat and medium-carbohydrate (45% fat, 42% carbohydrate, 12% protein), compared to low-fat/high carbohydrate (29% fat, 54% carbohydrate, 15% protein) and high-fat/low-carbohydrate (62% fat, 24% carbohydrate, 13% protein).

Researchers in Canada found that children who consumed a higher quality diet were more likely to perform better on a knowledge assessment test (Florence, Asbridge, & Veugelers, 2008). These data suggest that if high quality foods are served in the cafeteria, and consumed by the students, improvements in academic performance may result.

Unhealthy snacking has shown to have negative effects on a child's academic performance (Correa-Burrows, Burrows, Orellana, & Ivanovic, 2014), with 56% of the students in this study reporting having consumed snacks high in fat, sugar, salt, and energy. Students who were considered to have "healthy snacking habits" performed significantly better on standardized Mathematics and Language Arts exams compared to those who were considered to have "unhealthy snacking habits" (Correa-Burrows et al., 2014).

Meals high in simple carbohydrates such as sucrose and starch decrease postprandial memory function compared to meals higher in complex carbohydrates (Kanoski & Davidson, 2011). Smith and Foster (2008) observed that children consuming breakfast meals with a high

glycemic index were more likely to perform poorly in memory tests than those who consumed a breakfast with a low glycemic index.

Importance of School Meals

The childhood obesity epidemic also continues. In the years between 2013 to 2014, childhood obesity increased 11.3% in children 6 to 11 years of age (Ogden, Carroll, & Lawman, 2016). The prevalence of childhood obesity in 2015-2016 was 18.4% of children ages 6 to 11 and 20.6% of children ages 12 to 19 years (Hales, Carroll, Fryar, & Ogden, 2017). Benefits of consuming school lunches include improved nutrition, promotion of healthy growth and development, protection against diseases and chronic conditions, and the development of eating habits that can carry into adulthood (Buzby & Guthrie, 2002a). Much of a child's time is spent in the school environment, making the school environment an important influence in the development of a child. For example, the composition of school lunches (i.e., the number and type of food groups served) and school lunch practices (i.e., meal timing can serve as a basis for nutrition habits of the students that can carry with these students into later in life (Upton, Upton, & Taylor, 2012).

The Fight against Food Insecurity

Food insecurity plays a role in a child's academic performance (Jyoti, Frongillo, & Jones, 2005). Currently, an estimated 20% of households that include school-aged children are considered food insecure (Huang, Barnidge, & Kim, 2015). Under-nutrition experienced at critical periods of growth and development can influence school performance, behavior, and overall cognitive development (Martins et al., 2011). Children in food insecure households exhibited smaller increases in reading score than students who remained in a food secure household (Jyoti et al., 2005).

School meals are imperative to children coming from food insecure homes in sense of providing proper nutrition. Participation in the NSLP decreases rates of food insecurity by 14% in the months that school is in session (Huang & Barnidge, 2016). The rate of food insufficiency on household has shown to remain stable through the months of January and May, and then increase in June and July when school is not in session (Huang et al., 2015). In Indiana, one in five children are at risk of hunger (Feeding America, 2018), and in 2017, an estimated 47.1% of children receive free and reduced lunches during the academic year (Kids Count Data Center, 2017).

Summary

In summary, a balanced diet can aid in child's performance in school. Nutrients such as iron, zinc, folate, vitamin A, vitamin B_6, vitamin B_{12}, vitamin C, docosahexanoic acid (DHA), and eicosapentaenoic acid are important in cognitive functions. Without these nutrients in the diet, cognitive performance may decline. As the childhood obesity epidemic continues, it is important that children receive proper nutrition through school meals. School meals may also be the only full meal some students receive as they may come from food insecure homes. Therefore, it is important that the meals they receive provide proper nutrition.

Recess and Learning

Theories of Play

The CDC (2017) defines recess as a "regularly scheduled period within the school day for physical activity and play that is monitored by trained staff or volunteers." Although recess is usually seen as a reward to children in school for their work, many theories support the general concept of recess. The theories of 'play' have been researched since the eighteenth and nineteenth centuries (Tomlin, 2007). These theories investigate the purpose of why children play

and the necessity of play. The four main classical theories of play that explain the need for play are: 1) the surplus energy theory, 2) the recreation theory, 3) the pre-exercise theory, and 4) the recapitulation theory. These classical theories relate back on the early discovery of energy, instincts and evolution (Mellou, 2006).

The surplus energy theory has been used to justify recess and other break time activities in the United States, Australia, and the United Kingdom (Evans & Pellegrini, 1997). The surplus energy theory stems from by Friedrich yon Schiller's suggestion that play ridded a child of the additional energy that remained when primary needs were satisfied. Primary needs originally referred to the activities of hunting and gathering. As food and other necessities for living are provided for young children, they can use this 'surplus' energy for play (Evans & Pellegrini, 1997). The common thought that when children are restless during class, it is time for a break stems from this rational. Herbert Spencer, a British philosopher and psychologist, proposed the original surplus energy theory. Spencer suggested that energy was accumulated when the body was at rest, such as when a student is sitting in the classroom for prolonged periods of time (Evans & Pellegrini, 1997). Surplus energy is characterized as fidgeting, restlessness and distraction from lessons. It is believed that break time or "recess" is needed to help relieve the built up energy.

The recreation theory was suggested by Lazarus and Patrick (Mitchell & Mason, 1948). The recreation theory proposes that play is for the person performing the act. Patrick defines play as "those human activities which are free and spontaneous, and which are pursued for their own sake alone" and Lazarus defines play as an "activity which is in itself free, aimless, amusing, or diverting" (Mitchell & Mason, 1948). The pre-exercise theory was suggested by Groos (Mitchell & Mason, 1948; Gray, 2017). His definition of play suggests that play is an instinctive act. The

act of play fighting and wrestling teaches skills needed for survival later in life (Mitchell & Mason, 1948). Finally, the recapitulation theory suggested by Hall proposes that play is motor skills of the past that continue into the present, that these motor habits are hereditary and ritualistic (Mitchell & Mason, 1948; White, 1992).

As the study of behaviors and cognitive development emerged, deeper meanings of play were proposed (Ortega, 2003). In the 1930s, Jean Piaget began to study the behaviors of children, which lead to his eventual theories of play. In Piaget's first theory of play, he investigated the moral thought of children by evaluating them while playing games and the rules they developed. This work is described as "a monument to the social and moral logic found in spontaneous play from which judgement about what is right and what is wrong and about what we should do and not do grows and develops" (Ortega, 2003). Piaget observed how the initial rules of a game are accepted, then as the game goes on, participants will add rules of their own decision that are made up based on the individual's personal initiatives, cultural conventions, and framework of fairness.

In 1959, Piaget created a contradicting theory of play. This theory defined play as a child's first steps to thinking as he theorized that play and though came from the same source. Through this theory, Piaget results in decreasing the importance of play. Piaget states that although thought and play may come from the same source, they have different paths and outcomes (Ortega, 2003). Two important aspects of Piaget's second theory are assimilation and accommodation. Assimilation is when already obtained knowledge is used to deal with a new object or situation. Accommodation is when already obtained knowledge does not work or does not relate to the new object or situation and thus the knowledge needs to be changed (McLeod, 2015). In explaining his new theory, Piaget states that in intellectual thought, assimilation and

accommodation are at equilibrium, while during play, assimilation and accommodation are not at equilibrium. Therefore, little concentration is needed and play becomes more of an unstimulating, fun activity (Ortega, 2003).

In relation to Piaget's basic concepts of play, Vygotsky's theory of play also involves thought and the interpersonal relationships developed through play (Ortega, 2003). In contradiction to Piaget, Vygotsky described play as a more important activity for developing relationships rather than psychological nature (Ortega, 2003). Vygotsky's theory, play and cultural mediation, also relates to Piaget's as it ties together the concepts of action and consciousness. Vygotsky's theory suggests much thought goes into the action of play as play involves not only the point of view from an individual child, but also the point of view of the other children playing. In this theory, play is seen as a source of development for children. Vygotsky defines play as something that should be spontaneous and subconscious, the same way a thought develops in the mind (Ortega, 2003). The subject of play and how it relates to cognitive development has been studied for many years, suggesting that recess plays a larger role than just a break from learning.

Importance of School Recess

Recess at school provides a basis for a child's physical activity habits as a large part of child's day is spent in school (Demisse, Brener, McManus, Shanklin, Hawkins, & Kann, 2015). Recess has been shown to comprise up to 40% of a child's daily physical activity (Ishii, Shibara, Sato, & Oka, 2014). Only an estimated one-quarter of children in the United States meet the 2008 Physical Activity Guidelines for Americans recommendation of at least 60 minutes of physical activity per day (National Physical Activity Plan, 2014). With recess being such a large

contributor to a child's physical activity, it is an important factor to increase the number of children reaching the recommended amount of physical activity.

Recess provides more than just a time for physical activity. Recess plays a significant role in developing peer relationships during school hours, supporting the social well-being of students (Haapla, Hirvensalo, Laine, Laakso, Hakonen, Kankaanpaa, Lintunen, & Tammelin, 2014). According to Lee, Burgeson, Fulton, & Spain (2007), only an estimated 57% of school districts required regularly scheduled recess nationally and only 40% had specific recess policies.

Increase in Ability to Learn

Physical activity or recess during the school day increases circulation, allowing students to have a break from learning, and preventing students from sitting for long hours (Jensen, 2003. When exercising, circulation of oxygen increases, especially while stretching. When more oxygen is circulating, the more oxygen reaches the brain (Jensen, 2003). In addition to increasing circulation, Jensen (2003) suggests that the brain needs time to process new information. Breaks such as recess gives students the opportunity to process information learned during instructional time. Sitting for long hours can cause negative physical effects such as poor breathing and strained spinal cord (Jensen, 2003). In sum, breaks involving physical activity can be beneficial to students' education.

A more complex benefit to recess and physical activity is the catecholamine hypothesis, first proposed by Cooper in 1973 (McMorris, 2018). The catecholamine hypothesis may explain the phenomenon that links physical activity to cognition. When humans participate in physical activity, the hormones norepinephrine and dopamine, known as catecholamines, are released. If the level of catecholamines reaches a level high enough level in the plasma, they may cross the blood brain barrier and activate the brain reticular formation, which plays a major role in

alertness (McMorris, 2018). This hypothesis suggests that moderate intensity physical activity increases cognitive performance; but, as the intensity rises, cognitive performance is hindered as high amounts of catecholamines in the brain activate neurons that are not required cognition, and thus exhaust the brain leading to poor cognitive performance (McMorris, 2018).

Another theory that supports the relationship between physical activity and learning is the connection between cognitive and motor development. Some motor functions such as gross motor skills (motor skills that use large parts or the entire body) require higher levels of cognition. Schott and Klotzbier (2018) evaluated studies that employ children with a cognitive task while performing a motor function such as walking, running, or galloping. The studies found varying results in cognitive performance. Studies in the relationship between motor and cognitive function show conflicting results, calling for further investigation.

Physical activity can be used to manage stress in children (Portugal, 2018). Stress has negative effects on cognition as cortisol released during stress (Portugal, 2018). Chronic stress leads to the continual release of cortisol, causing caused learning deficiencies as it continually release of cortisol. Cortisol activates hypothalamic-pituitary-adrenal axis (HPA axis) (Portugal, 2018). The chronic release of cortisol persistently activates the HPA axis which has negative effects on cognition.

Exercise also activates the HPA axis. While the difference is not clear, activation of the HPA axis can have positive effects when activated by exercise (Portugal, 2018). It is proposed that the activation of the HPA by exercise is more beneficial in that exercise is a predictable and controllable stressor and, if the exercise is a pleasurable activity, it initiates a rewarding stimulus (Portugal, 2018). If the exercise activity is fun and enjoyable to the student, it may greatly decrease their stress level and have positive effects on their cognitive performance.

For over twenty-five years, researchers have suggested that breaks from structured lessons can actually increase a student's ability to learn (Bjorklund & Harnishfeger, 1990; Dempster, 1992; Toppino, Kasserman, Mracek, 1991; and Waite-Stupiansky & Findlay, 2002). This position stems from the lack of maturity of the nervous system of children. Specifically, because the nervous systems of children are not as mature and have less experience than older students, they are more susceptible to cognitive interference, which reduces their ability to learn (Dempster, 1992). This is known as the cognitive immaturity theory (Pellegrini & Bohn, 2005). While recess and free-time are being cut in the classrooms in the United States, other countries provide multiple breaks for students to refocus. The educational policy in Shanghai, China, for example, states that elementary-level courses should only last for 35 minutes at a time with about 10 minutes of free-time to every 40-minute class period. (Chang & Coward, 2015).

When recess's impact on academic performance was assessed, there were no negative relationships between recess and focus in the classroom (Rasberry, Lee, Robin, Laris, Russell, Coyle, & Nihiser, 2011). When recess was offered to students, children preformed more work and were less fidgety compared to the days they were not offered recess (Jarrett, Maxwell, Dickerson, Hoge, Davies, & Yetley, 1998). These studies debunk the myths that recess may excite students and prevent them from concentrating on classes after recess.

School recess has been shown to improve the learning atmosphere in the classroom. Instructors of children that received daily recess reported improved behavior scores compared to instructors of children that experienced minimum or no break during the school day (Barros, Silver, & Stein, 2009). Short bouts of physical activity have been shown to improve attention-to-task by 8.3% (Mahar, 2011). Sallis (2010) states that children exposed to long periods of sedentariness leads to "squirming," which, in turn leads to wandering attentions. Pellegrini and

Davis (1993) found that when recess was delayed, students became more fidgety and paid less attention to what the instructor was teaching. These studies show that providing a consistent break to children during the school day improves student's attention, thus increasing their ability to learn.

Type of Physical Activity and Level of Fitness

Wang, Huang, Wu, & Wang (2014) divided elementary students into three different physical activity groups; low physical activity, middle physical activity, and high physical activity. Students in the middle physical activity group performed significantly better academically than the high physical activity group. Roberts et al. (2009) found that physically active students perform better academically. These results could not be explained by ethnic, racial, or socioeconomic variables, proving that physical activity during the school day can improve the learning atmosphere for all groups of students.

Sardinha, Marques, Martine, Palmeira, & Mindeerico (2014) found that students who were cardiorespiratory fit and of normal weight status had improved academic performance than those who were not cardiorespiratory fit and abnormal weight status. Both male and female Korean students who participated in both vigorous and moderate physical activity showed correlations with high academic performance (So, 2012). McIsaac, Kirk, & Kuhle (2015) found that healthy lifestyle behaviors such as, diet quality, physical activity, and sugar-sweetened beverage consumption, was related to increased academic performance in different subjects. Not being physically active at recess, skipping breakfast, and not being physically active after school showed lower academic performance in mathematics while increased diet quality, physical activity, and low sugar-sweetened beverage consumption related to improved academic

performance in Language Arts. These studies display the positive effects of a health healthy lifestyle on the academic outcomes of a student.

Removal of Recess from the Curriculum

Across the nation, in an effort to increase instructional time during the day, there has been a decrease in the amount of time set aside for recess during the school day (Pellegrini & Bohn, 2005). In 2002, the No Child Left Behind Act (NCLB) increased accountability to ensure all children receive proper education (U. S. Department of Education [US-DOE], 2017). Although this act was implemented to increase education, it actually may have hindered student's ability to learn as, because of this act, an estimated 44% of schools cut time on recess and physical education to increase time spent on reading and math skills (Center for Education Policy, 2007). While the NCLB did not explicitly require schools to cut recess from their curriculum, it caused many to amend their recess policy. In 2006, over half (57%) of the schools surveyed required a regularly scheduled recess; in 2011, only 40% of these schools had explicit recess policies (Jarrett, 2013). Roberts, Freed, and McCarthy (2009) suggested that if healthy weight children perform better in academic subjects compared to children who are classify as overweight or obese, physical education and recess should not be cut from the curriculum.

In 2015, the "Every Student Succeeds Act" was passed into law. This act allows states more flexibility with the requirements of the NCLB if the state has developed plans to improve instruction, close gaps in academic achievement, and increase equity in the school environment (US DOE, 2017). Included in this act are requirements such as establishing a college and career-ready standard, assessment of all students for needed accommodations, and tests to measure higher-order thinking skills (US DOE, 2017). The new policy does not mention leaving time for physical activity but as more power is given to states, time for recess may be able to be salvaged.

Across the world, there are many different recommendations and allowances of recess to school children. Jarrett (2013) states that the countries ranking highest in international tests tend to allow more frequent play breaks than those that are given in the United States. Some countries give school children 15 minutes of play for every 45 minutes of work and others allow more time for lunch and recess (Jarrett, 2013).

Some schools justify their ridding of recess by making up the lost physical activity time with physical education class. This prompts the question as to which is more beneficial to students; physical education or recess? The CDC (2017) does not recommend replacing recess with physical education and vice versa. Participation in physical education class has been shown to result in a greater number of steps per hour and metabolic equivalents than a longer recess period (Fromel, Svozil, Chmelik, Jakubec, & Groffik, 2016). In contrast, the Robert Wood Johnson Foundation (2007) reported there were more opportunities (average minutes per day multiplied by percentage of students participating) for physical activity during recess than with physical education classes, with recess making up 42% of the opportunity, physical education making up 32%, and after school activities making up 26% of the opportunity for physical activity. Jarrett (2013) defended recess over physical education using a series of arguments that centered around the concept that students do not have the same social experience in physical education class that they would have on the playground. In physical education class, students are often told what games to play and the rules to play by. In contrast, recess gives students the opportunity to make choices and develop their own rules for play. Students also have more opportunity to express leadership, creativity, and resolve conflicts on their own during recess (Jarrett, 2013).

Summary

In sum, recess plays an important role in the development of a child. Many theories of play have been proposed in attempt to answer the question “why children play?”. Many of these theories defend the importance of play in a child’s daily life. Many research studies have proven the positive impacts recess can have on a child’s academic performance. Recess gives a student time to process the information collected from class time. Not only does recess give the child opportunity to rest the mind, it also presents the opportunity to develop social and interpersonal skills. There is no regulation on the length of time a school should allow students for recess, therefore causing variations in recess across the country. The removal of recess is becoming more prominent as institutions steer more focus toward lengthening academic hours. Although longer hours in the classroom may seem beneficial to the student, the result of removing recess may be detrimental

Timing of Lunch and Recess

Duration of Lunch

Schools participating in the NSLP must serve lunch between the hours of 10 A. M. and 2 P. M. (U. S. Government Publishing Office, 2017), but there is no national standard for the duration of a lunch period (Cohen et al., 2016). Nonetheless, it is recommended that students be given at least 20 minutes for lunch from the time they have received their meal and are sitting down (National Alliance for Nutrition and Activity, 2005).

Evidence indicates, however, that this recommendation does not provide enough time for students to consume their lunch. More than half (61%) of students in California, for example, claimed they felt rushed to finish their lunch when given a 36-minute lunch period. Long lunch

lines cut into this time and most students claimed they would consume the school lunch more often if there were shorter lunch lines, increasing the time to consume their food (Perry Undem Research/Communication, 2013).

As long ago as 1996, 44% of cafeteria managers claimed that not having enough time for students to eat was a large contributor to plate waste in the school cafeteria (United States General Accounting Office, 1996). More recently, Buzby and Guthrie (2002b) suggested that increasing the length of the lunch period may help decrease plate waste. Bergman, Buergel, Englund, and Femrite (2004) also demonstrated the need for adequate time for students to consume lunch. When these researchers compared a 30-minute lunch period to a 20-minute lunch period, plate waste decreased from 43.5% to 27.2% when students were given a longer lunch period.

Not only are short lunch periods associated with increased plate waste, they are also associated with reduced nutrient intake. Cohen et al. (2016) found that when students were given 25 minutes to eat, 57% of students were more likely to choose a fruit as a part of their lunch compared to 44% of students when only given 20 minutes to eat. In addition, the extra 5 minutes to consume lunch had an effect on the consumption of the total entrée, milk, and vegetables. Specifically, those who had 20 minutes to eat consumed 13% less of the total entrée, 10% less milk, and 12% less vegetables compared to those who had 25 minutes. The odds ratio of selecting a fruit or vegetable increased when students were given a longer lunch period. Not only does the length of lunch impact the consumption of nutrients, but it may also impact the students' BMI and weight. In 2014, Bhatt found that a 10-minute increase in lunch period length decreased BMI of student 1.1-1.3% and reduced the probability of students being overweight by 2-3.7 percentage points.

Bergman, Buergel, Joseph, and Sanchez (2000) suggested that younger children need longer lunch periods than older students as the youngsters tend to participate more in non-consumption activities, such as talking, organizing eating area, and playing with food. These researchers do not call for a stricter lunch period that restricts socializing with peers, as that aspect is an important factor in the school day, but rather these authors recommended longer lunch periods so that students are able to build relationships with their peers while consuming their lunch without being rushed.

Lastly, Chapman, Cohen, Canterberry, and Carton (2017) found the timing of lunch played a role in the consumption of lunch. Students with an "early" lunch scheduled between 10:45AM and 11:30AM consumed 5.8% less of their entrée, and 4.5% less of their milk when compared to students who had a "midday" lunch scheduled between 11:55AM and 12:15PM. Those who had a "late" lunch scheduled between 12:25PM to 12:55PM consumed less of their entrée and fruit when compared to those with a "midday" lunch.

Timing and Duration of Recess

Jarrett (2013) states that most states do not have a recess policy and if a recess policy exists, it is based off the many and varying recommendations from different organizations. It is the position of the National Association for Sport and Physical Education (NASPE) that all elementary schools provide at least 20 minutes for recess, with recess not taking the place of physical education classes (National Association for Sport and Physical Education, 2006). Timing and duration of recess varies greatly throughout the United States. According to Pellegrini and Bohn (2005), individual school districts commonly determine recess policies. It was observed that in some schools, time and duration of recess were even more varied as the teachers had the authority to dictate when and for how long the students were allowed outside. In

study surveying school's practices on recess it was found that the length of recess varied according to certain characteristics of the school such as the school size, location, region, minority enrollment, and percent of students on free and reduced-price lunch (Robert John Wood Johnson Foundation, 2007).

The American Academy of Pediatrics (2012) recommends that recess should be scheduled at regular intervals for children to refocus with no determined time of duration. Jarrett (2013) presents a chart exhibiting six different organizations recommendations for a school's recess policy. The recommendations range from 20 to 60 minutes of physical activity each day and others just promote the general offering of recess with no set recommendation of the duration of recess. Many research studies have been conducted on the duration of physical activity and its educational outcomes. On single bouts of physical activity, short bouts (less than 10 minutes) and medium bouts (20 to 30 minutes) have shown positive effects on educational outcomes where long bouts (greater than 30 minutes) have shown limited effects on educational outcomes (Howie & Pate, 2018).

It is important that lunch and recess are kept separate. Wyver, Engelen, Bundy, and Naughton (2012) evaluated the behaviors of children that were given a combined lunch and recess period. Results indicated that children were given, on average, 60 to 90 minutes for lunch and recess, with an average of 15-30 minutes spent on eating. Themes that emerged from this study included decreased consumption of lunch (throwing out food to focus on play) and decreased intensity of play, which may have a negative effect on academic performance. The results concur with those of Price and Just (2015) when they stated children will rush through lunch to move on to recess.

Summary

In sum, there is no national standard for the duration of lunch or recess. Many students have claimed to have felt rushed to consume their lunch to be on time for the recess or the next class. Research studies have found that the shorter the lunch period, the increased amount of plate waste a school tends to have. The timing of lunch periods may also impact the consumption of certain food groups. Lunch is also an important time for social interaction. Shorter lunch periods do not promote conversating with friends. Therefore, it is not a recommended to remedy the problem by not allowing talking in the cafeteria, but to allow an adequate amount of time for students to interact with each other and finish their lunch at a leisurely pace. Recess is important to provide breaks in instructional time for students. The multitude of different recommendations regarding the length of recess can cause a challenge in determining what is best for students. Research has shown that short and medium bouts of recess (10 to 30 minutes) have a positive impact on academic performance when compared to bouts of recess greater than 30 minutes. The separation of lunch and recess is also important. When recess and lunch are offered within the same time period, students tend to focus more on recess than consuming their lunch, causing increased plate waste and a decreased opportunity for students to consume the nutrients needed to perform academically.

Benefits of Recess Before Lunch

The Center for Disease Control and Prevention (CDC) (2011) recommends that school administrators schedule recess before lunch to reduce plate waste and increase consumption of foods. Scheduling recess before lunch, rather than after lunch as has been the tradition, has been associated with many positive effects, increased consumption of school lunches, improved

behaviors in the lunchroom and classroom (Stohbehn, Strobehn, Lanningham-Foster, Litchfield, Scheidel, & Delger, 2016), the ability to manage recess conflicts outside of the classroom (Rainville, Wolf, & Carr, 2005), a significant decrease in lunch line wait time of more than two minutes (Tanka, Richards, Takeuchi, Otani & Maddock, 2005), a reduction in discipline problems and positive remarks from both teachers and administrators, and a slight, but non-significant, decrease in plate waste (Tanka et al., 2005). Chapman et al. (2017) found that fruit intake increased by 5.1% when recess was scheduled before lunch compared to before, but there was no difference in entrée, vegetable, or milk consumption between the schedules. Despite these benefits, only an estimated 37% of elementary schools across the nation scheduled recess before lunch in 2012 (U. S. Department of Agriculture, 2012).

In 2003, the Montana Office of Public Instruction conducted a statewide campaign to put recess before lunch. Observational data indicate a decrease in the amount of food and beverages wasted in the lunch room; a calmer atmosphere in the lunchroom; a decrease in discipline problems in the lunchroom, playground, and classroom; an improved learning atmosphere in the classroom; and more time for students to meet with the teacher before going to recess (The Montana Office of Publication Instruction, 2003).

According to Price and Just (2015), scheduling recess after lunch causes the children to focus on being "done" with lunch as quickly as possible to move on to recess. In contrast, Hunsberger, McGinnis, Smith, Beamer, and O'Malley (2014) found that teachers perceived their students were more calm and ready to learn after having recess before lunch. It has been suggested that scheduling recess before lunch could reduce stomach discomfort and dizziness at recess (White, 2003). Lastly, moving recess to before lunch has also been shown to improve the consumption of fruits and vegetables by 54%. (Price & Just, 2015).

"Plate waste," defined as the portion of edible food that is uneaten and thrown away from a meal (Buzby & Guthrie, 2002a), can be used as a direct measure of efficiency for school operations involving the nutrition of the school's students. One-fourth of public school cafeteria managers mentioned plate waste in the lunchroom as a moderate problem (Bergman, Buergel, Femrite, & Englund, 2004). Although there is no gold standard set for an acceptable amount of plate waste in a school, in 2002, the estimated cost of plate waste to the economy was $600 million (Buzby & Gurthrie, 2002a). This number does not account for administrative expenses, any wasted commodity entitlements, or the private cost of wasted foods

Schools in the state of Washington that placed recess before lunch found a significant increase in food consumption and a significant decreased in plate waste from 40.7% to 27.2% (Bergman, Buergel, Englund, & Femrite, 2004). When recess was scheduled before lunch, consumption of calories from carbohydrates increased from 52% to 56.7% while the consumption of calories from fat decreased from an 86.2% to 77.6%.

The Missouri Team Nutrition program, a division of the Missouri Department of Health and Senior Services (MDHSS), recently published an online *Recess Before Lunch Toolkit* (MDHSS, 2016). The toolkit includes background research, testimonials, sample letters to parents, practical implementation tips, a sample recess before lunch schedule, a recess before lunch readiness checklist, and a list of challenges and solutions experienced as Missouri attempted to implement a recess before lunch policy statewide. A survey of Missouri school nurses indicated 60% of elementary schools in Missouri implement a recess before lunch policy. Overall, Missouri educators reported the policy change was beneficial to both the students and staff, creating a better eating and academic environment. Positive benefits cited included the children being settled down and ready to learn when they return to the classroom, fewer fights on

the playground and better classroom behavior, students not rushing through lunch to get out to recess, and students who are hungrier when it's time for lunch, so they eat better. Four out of 5 principals reported that recess before lunch had a positive impact on academic achievement (MDHSS, 2016).

A recently published guide that provided tips for how to successfully incorporate changes in the Healthy, Hunger-Free Kids Act suggested that moving recess before lunch may help reduce plate waste in the school (USDA, 2016). School food service directors have stated that students who have recess before lunch seem hungrier and more likely to consume everything on their tray (USDA FNS, 2012). Another statement claimed that students who have recess after lunch tend to focus more attention on moving to recess rather than consuming their lunch.

Summary

In sum, there are many benefits to scheduling recess before lunch. These benefits include improved behavior on the playground, in the cafeteria, and classroom, increased consumption of lunch, a decrease in lunch line wait time, a reduction in discipline, and a decrease in plate waste. Schools in states such as Montana, Missouri, and Washington have implemented this schedule change and have found positive results. Other benefits found include increased student intake of fruits and vegetables and decreased accounts of stomach discomfort on the playground.

Barriers to Recess Before Lunch

While research clearly indicates benefits of offering recess before the lunch period, many barriers prevent schools from making this change. Bounds and Nettles (2008) found that, although school professionals such as school administrators, teachers, and nutrition directors were in favor and agreed with the benefits of a recess before lunch policy, there were significant

challenges in implementing the policy, including maintenance of instructional time, workload to staff, food consumption at lunch, scheduling, and logistics of hand washing, inclement weather, and those who packed their lunch.

According to Hunsberger, McGinnis, Smith, Beamer, and O'Malley (2014), although several positive benefits were seen when the schedule changed, some children went for more than 5 hours between arriving at school and lunch. Rainville, Wolf, and Carr (2006) surveyed administrators, nutrition personnel, teachers, and parents to identify barriers of scheduling recess before lunch. Among administrators, the most frequently mentioned barriers were preservation of morning hours for academics; supervision; hand washing; cold weather preparation; possible resistance by faculty, staff, and parents; and tradition. Concerns mentioned by nutrition personnel included recess/lunchroom supervision, movement of children off the playground, scheduling, and preparation for cold weather. Teacher's concerns included logistics, academic priorities, willingness of administrators, weather, scheduling blocks and tradition. Parent's main concerns included logistics, scheduling, staffing, space, nutrition beliefs, and previous experiences by a family member, tradition, student behavior, and communication. White (2003) also reported that teachers were concerned about being able to convince the students to come in from the playground and wash their hands before lunch.

Recess Before Lunch Resources Available to Schools

Rainville, Lofton, and Carr (2009) surveyed school nutrition professionals to discover the best practices in implementing a recess before lunch policy. The results of their study were used to develop a "best practice" checklist that include suggestions for pilot testing, assessing level of productivity, identifying adequate communication, cooperation, and supervision.

The Montana Team Nutrition Program has developed a guide that provides general information to be included in a "recess before lunch" policy. In addition to sample schedules and educational marketing materials, the Montana implementation guide outlines benefits of recess before lunch and lists steps to implement the policy, to include how to: educate staff, students, and parents about the benefits of a recess before lunch policy; plan a new recess and lunch schedule; develop a handwashing plan; allow adequate time for students to consume lunch; and increase school staff in the lunchroom when the policy is first implemented (Stenberg et al., 2003).

Summary

In summary, there are many benefits to scheduling recess before lunch, but only a small amount of schools have implemented this practice. Studies have found there are many barriers to the schedule change. Barriers that have been discovered through research include breaking of tradition, long hours between breakfast at home and lunch time, preservation of academic hours, hand washing procedures, cold weather, revision of the daily schedule, and inadequate space on the playground and the cafeteria. To successfully implement a recess before lunch policy, these barriers need to be broken. Those that have had successful implementation of the policy have created toolkits and guides to aid other schools in eliminating barriers and implement their own recess before lunch policy.

School Lunch and Recess in Indiana

School Lunch Practices in Indiana

According to the Indiana Department of Education IN DOE (2017a), as of June 2017, a total of 586 schools and other institutions in Indiana participate in the NSLP. Of these

institutions, 292 are public schools, 172 are non-public schools, and the remaining numbers include camps, boarding schools, and residential child care institutions. Schools that participate in the NSLP must serve lunch between the hours of 10 A. M. and 2 P. M. (U. S. Government Publishing Office, 2017). If the school does not participate in the NSLP, there are no regulations on timing of lunch (S. Kenworthy, personal communication, March 15, 2017). Currently, there are no national standards for the length of a school lunch period. The prevalence of recess before lunch in the state of Indiana is also unknown (S. Kenworthy, personal communication, March 15, 2017).

Current Laws and Standards of Recess in Indiana

Indiana Code 20-30-7.5 states that each school must allow time for daily physical activity daily (Indiana General Assembly, 2016). According to the Indiana Model School Wellness Policy on Physical Activity and Nutrition, providing 30 to 60 minutes of physical activity per day is ideal (IN-DOE, 2017b).

Summary

In summary, prior to this study, the prevalence of recess before lunch in Indiana elementary schools was unknown. Many schools in Indiana participate and benefit from the NSLP. Indiana mandates that schools provide time for physical activity throughout the day, with the recommended length being 30 to 60 minutes.

Summary

The standards of National School Lunch Program strive to provide students with the nutrients needed for proper growth, development, and academic performance. Nutrition plays an important role in learning as it provides calories for energy, micronutrients that improve brain functioning and development, and increases attention in the classroom. From reviewing classical

theories of play, it can be inferred how physical activity and recess are important components of the school day. School recess has been cast aside with as schools are pressured to provide more instruction time to students. These breaks in instruction positively affect the learning environment in the classroom. With short bouts of physical activity having improvements on cognitive function and calmness in the class room, physical activity has a large impact on the academic performance of a student. By scheduling recess before lunch, the benefits of these activities can be exemplified. Scheduling recess before lunch has shown to have many benefits such as improved academic performance, a calmer classroom atmosphere, increased consumption of foods, decreased plate waste, and decreased food costs to schools. Moving recess before lunch has been met with criticism. Barriers to schools scheduling recess before lunch include staffing issues, scheduling issues, lack of resources, and breaking of tradition. By providing resources such as guidelines and remedies to resolve these barriers, more schools will be able to adapt to scheduling recess before lunch and reap the benefits that accompany this schedule change.

CHAPTER 3

METHODOLOGY

The purpose of this study is to identify the practices, perceived benefits, and attitudes of elementary school principals and food service directors toward scheduling recess before lunch in Indiana. This chapter will describe the methods used to conduct the study.

Institutional Review Board

Permission was requested from Ball State University Institutional Review Board prior to distributing the survey for this study. The board declared this project as exempt (Appendix A-1). The researcher conducting this analysis completed the Collaborative Institutional Training Initiative training (Appendix A-2).

Subjects

A copy of the 2017-2018 Indiana School Directory was obtained from Dr. Todd Bess, Executive director of the Indiana Association of School Principals. The directory contained the names and email addresses of 1,868 public and 388 private schools in Indiana (n=2,206). Initially, the population was delimited to schools that only served children up through 8th grade (i.e., 507 high schools were removed), resulting in 1,467 public and 232 private schools (n=1699).

In the initial survey, principals of "middle schools" (i.e., schools limited to students in grades 6-8) were included in the email request; however, several principals indicated in their responses that middle schools in Indiana do not provide recess for these students. Thus, in the second wave, all schools that had sixth grade as the lowest grade in the school (n=262; 261 public and 1 private) were removed from the list, leaving a population of 1,392 elementary schools (1,161 public and 231 private). Using the sample size calculator (https://www.surveysystem.com/sscalc.htm) with a 95% confidence level, a confidence interval of 4, and a population of 1,392, a total of 420 responses from school principals were needed to obtain reflect those of the target population.

Instruments

A survey, comprised of questions from two previous "Recess Before Lunch" surveys (National Food Service Management Institute, 2008; Bark, Stenberg, Sutherland, & Hayes 2010), was developed by the researchers (Appendix B). The survey included questions such as: the type of school (public or private), the Indiana School Nutrition Association district, the number of students enrolled, percent of students on free or reduced lunch, number of recess periods offered to each grade, the timing of lunch and recess, and any perceived benefits associated with the timing of lunch and recess.

Reliability

Prior to distributing the survey, the reliability of the survey was conducted by administering the test to six elementary principals from a neighboring state twice within a period of a week. The reliability coefficient was determined from the surveys using Kappa coefficient. The calculated Kappa coefficient was 1.0, indicating agreement between survey attempts.

Validity

Face and content validity were determined by five experts in the field, including an individual from the Indiana Department of Education, School and Community Nutrition unit, the Indiana State Coordinator for Action for Healthy Kids, a professor of Elementary Education in the College of Education at a Midwestern university, and two university faculty members with expertise in survey design and evaluation.

Letter of Permission and Consent

Permission to advertise the survey to elementary school principals in Indiana through an electronic newsletter was obtained from Hannah Ramsland, Indiana Director for Action for Healthy Kids (Appendix C-1). Permission and access to the names and email addresses of all Indiana Elementary School principals was obtained from Dr. Todd Bess, Executive Director of the Indiana Association of School Principals. Because the anonymous survey as deemed exempt, a formal consent form was not required by the IRB.

Methods

The link to an anonymous survey (Appendix B), created within the Qualtrics software platform (www.qualtrics.com) and based primarily on two previous surveys used in "recess before lunch" research (National Food Service Management 2008; Bark & Stenberg, 2008), was embedded into an individualized email message that was initially sent to each elementary school principal member of the Indiana Association of School Principals on October 18, 2017 who served students in, at a minimum, grades 1 through 8 (Appendix D-1), using the email addresses provided to the researcher by the Executive Director of the Indiana Association of School Principals. The initial email was sent to 1,699 principals by this researcher's thesis committee

chair (Friesen; Director of the Nutrition and Dietetics Program) on behalf of Dr. Stroud, Professor of Elementary Education of the Teacher's College at Ball State University, a faculty member known to many elementary principals across the state and a member on this researcher's thesis committee.

Approximately ten days after the initial survey (October 30, 2017), a second email (Appendix D-2). In the second round of distribution, based on feedback received by several principals, any principal in a school delimited to students in grade six or higher were removed from the database, as responses received during the first round indicated 6th grade students rarely have recess in the state of Indiana. Removing these emails addresses (n=307) resulted in a total of 1392 emails sent in the second wave. In keeping with the Dillman Tailored Design Method for increasing response rate (Dillman, Smyth & Christian, 2009), this email thanked those who had completed the survey, and requesting participation from those who had not participated.

In addition, in hopes of reaching a wider audience, the survey link was distributed in a blurb written for the September and October issues of the Indiana Action for Healthy Kids electronic newsletter (Appendix D-3).

Data Preparation

Data was downloaded from Qualtrics directly into SPSS v. 23 for Windows for analysis (SPSS, 2016). Any incomplete surveys in which the participant did not answer the critical question, "When is recess scheduled at your school?" were deleted from the analysis.

The enrollment of schools was categorized into low/average and high for public and private schools, respectively, based on school enrollment data from the Indiana Department of Education (Indiana DOE, 2017). The cut point was determined by finding the average enrollment

of public (n=364) and private (n=122) elementary schools in Indiana. Any enrollment value equal to or lower than these averages were considered "average/low" and any school with an enrollment value higher than the average Indiana enrollment was coded as "high."

Poverty levels of schools were established based on the percentage of students on free or reduced lunch. Schools having 0 to 25% of free and reduced lunch were coded as low poverty, those with 25.1 to 50 % of their students on free or reduced lunch were considered mid-low poverty, those with 50.1 to 75% were considered mid-high poverty, and those with 75.1 % or more of their students on free or reduced lunch were coded as high poverty. Qualitative data was organized into themes using Microsoft Word 2017.

Data Analysis

Descriptive statistics, including means, frequency counts and percents were run on all variables. Frequency counts (number and percent) were used to determine the overall prevalence of specific survey questions. Responses from open-ended questions were recorded and analyzed for trends in barriers and benefits of scheduling recess before lunch. Chi-square was used to find statistical differences in responses to questions for various factors such as location of school, public or private school, number of lunch periods the school offers in a day, enrollment of the school, and the percentage of students on free or reduced lunch. Statistical significance was set at $p \leq 0.05$.

Summary

This survey research was designed to identify the practices, opinions, and attitudes of elementary school principals and food service directors towards scheduling recess before lunch

in Indiana. Responses from 420 Indiana elementary school principal were needed to obtain a representative sample from the population. A survey investigating the benefits and barriers of implementing a recess before lunch program was created using previously distributed surveys. Action for Healthy Kids of Indiana and the Indiana Executive Director of the Indiana Association of School Principals aided in the distribution of the surveys to schools in Indiana. Data from the survey was analyzed to identify the benefits and barriers to providing elementary school students recess before lunch as well as any differences in responses in of location of school, type of school, enrollment, number of lunch periods offered, and percentage of students on free and reduced-price lunches.

CHAPTER 4

RESULTS

The purpose of this study is to identify the practices, perceived benefits, and attitudes of elementary schools principles toward scheduling recess before lunch in Indiana. This chapter will present an overview of the results obtained from the survey.

Demographic Characteristics

Of the 1,699 elementary school principals who were initially emailed a request to complete the survey, 81 were returned to the sender for a variety of reasons (i.e., unable to be found in the system, a problem with the recipient's email inbox), resulting in a survey population of 1,606. Of these, 402 surveys were returned in the first round (24% response rate). It should be noted that the survey was originally advertised in a monthly electronic newsletter from *Action for Healthy Kids Indiana.* During this time, 18 completed surveys (3% of the total) were returned. These 18 surveys are counted in the "first wave."

In the second round, based upon feedback from several middle school principals who emailed indicating recess was not part of the middle-school experience in Indiana, the addresses of 307 schools that had the 6th grade as their "lowest grade" were removed from the dataset, resulting in a total of 1,392 schools. Nineteen of these emails were returned undeliverable to the sender for a variety of problems, including unverifiable emails, retired principals, or were no

longer the principal. Thus, in the second wave, the link to the survey was successfully sent to 1,373 principals. From this mailing, an additional 179 surveys were returned (13% second-wave response rate).

Overall, 599 surveys were obtained from elementary school principals in Indiana. Of these, 72 incomplete surveys were removed from the analysis, leaving a total of 527 valid surveys. Using the population that excluded middle-school principals (n=1,392), a final response rate of 37.9% was obtained (i.e., 527 completed surveys from 1,392 accurate, non-middle-school addresses).

By title, 96% of the 527 individuals who completed the survey indicated they were principals (n= 507) and 2.7% (n = 14) reported they were assistant principals. Only six (1.1%) respondents chose not to disclose their position.

By gender, the majority (57.3%; n = 302) of respondents were female. Slightly more than one of every three respondents was male (37%; n = 195). Thirty participants (5.7%) chose not to disclose their gender (Table 1).

Table 1. Demographic Characteristics of Participants (n=527)

	n	%
Position		
Principal	507	96
Assistant Principal	14	2.7
Prefer Not to Disclose	6	1.1
Gender		
Male	195	37
Female	302	57.3
Prefer Not to Disclose	30	5.7
Type of School		
Public	387	73.4
Private	98	18.6
Other	12	2.3
Prefer Not to Disclose	30	5.7
Poverty Level		
Low	77	14.6
Mid-Low	116	22.0
Mid-High	95	18.0
High	50	9.5
Prefer Not to Disclose	189	35.9
Location		
Urban	132	25
Suburban	161	30.6
Rural	201	38.1
Prefer Not to Disclose	33	6.3
School Nutrition Region		
Region 1	51	9.7
Region 2	46	8.7
Region 3	48	9.1
Region 4	38	7.2
Region 5	50	9.5
Region 6	62	11.8
Region 7	62	11.8
Region 8	63	12
Region 9	65	12.3
Prefer Not to Disclose	40	7.6

The percentage of students on free and reduced lunch was used as a proxy to determine the income level of the students' family. Those that have 0-25% of students on free or reduced lunch are considered to have a low level of low-income families, those with 25.1-50% are considered to have a mid-low level of low-income families, schools with a 50.1-75% of students on free or reduced lunch are considered to have a mid-high level of low-income families, and schools with 75.1-100% of their students on free or reduced lunch are considered to have a high percentage of low income families. Approximately two-thirds of the respondents provided the percent of students receiving free or reduced lunch (n=338; 64.1%). Results indicated 14.6% (n = 77) of the responding schools were considered low percentage of students on free and reduced lunch, 22.0% (n = 116) were considered mid-low, 18.0% (n = 95) were mid-high, and 9.5% (n = 50) were considered having a high percentage of low-income students on free or reduced lunch. Slightly more than one-third (35.9%; n= 189) of the schools chose not to disclose the percentage of student on free and reduced lunch in this anonymous survey (Figure 1).

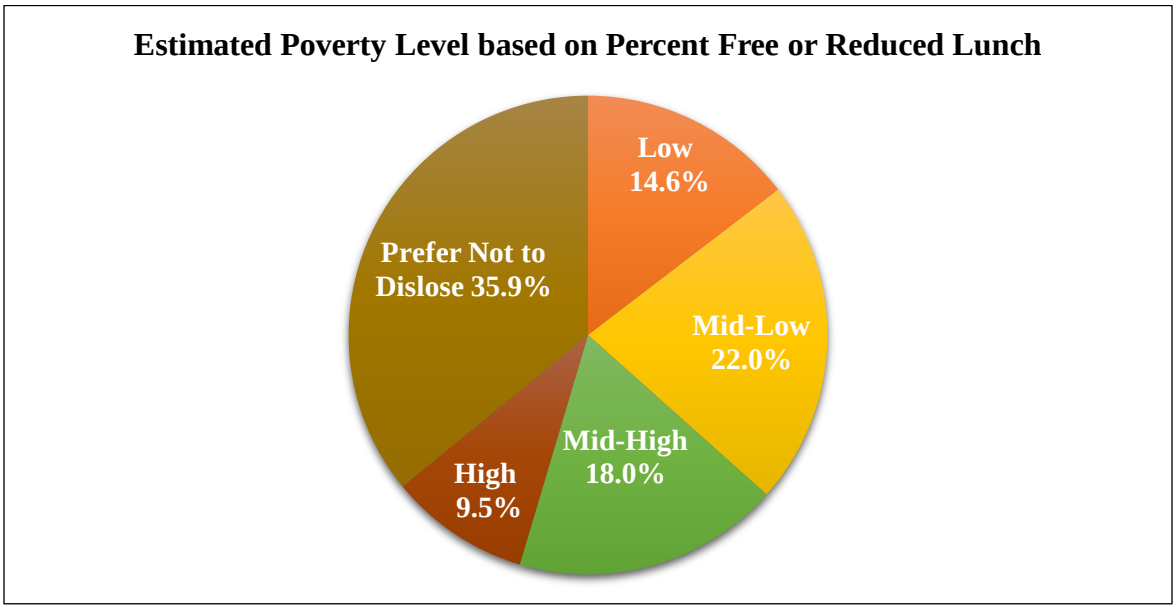

Figure 1. Estimated Poverty Level based on the Percent of Students on Free or Reduced Lunch (n=338).

Geographic Location

By geographic location, one-quarter (25%; n = 132) of the 494 respondents to this question indicated their school was located in an "urban area," slightly less than one-third (30.6%; n = 161) were located in a "suburban area," and slightly more than one-third (38.1%; n = 201) were located in a rural area (Figure 2). Thirty-three principals (6.3%) did not report their geographic region.

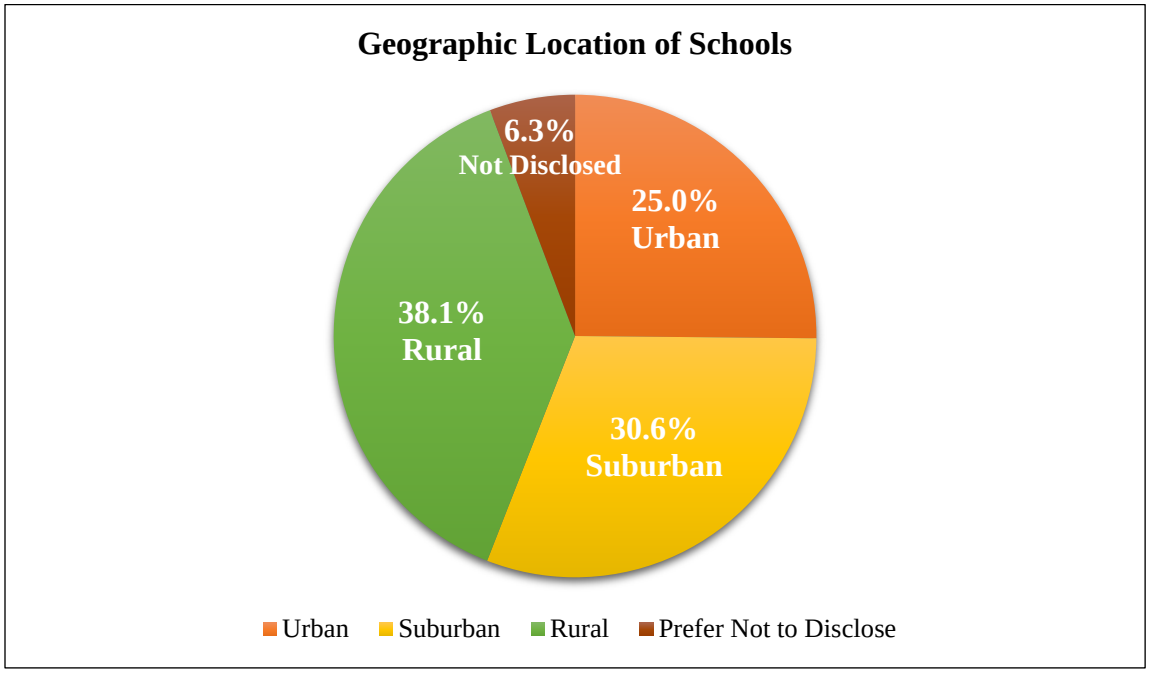

Figure 2. Self-Reported Geographic Location of the Responding Schools by Category (n=494).

Public vs. Private

Approximately three-quarters (73.4%; n = 387) of the responses to the survey came from public schools, representing 26% of the public elementary schools in Indiana (n=387 of 1,496). An additional 18.6% (n = 98) of the respondents were from private elementary schools, representing 16% of the private elementary schools in Indiana (n=98 of 627). Twelve of the

respondents (2.3%) identified their school as “other” while an additional 5.7% (n= 30) of the participants chose not to disclose the type of school.

School Nutrition Regions

Indiana is divided into nine School Nutrition Regions (Figure 3) that were created to promote communication between the schools located in each region. Each district offers education and training opportunities and works closely with Indiana DOE to create school nutrition policies (Indiana School Nutrition Association, 2018).

Figure 3. Indiana School Nutrition Regions.

A total of 487 (92.4%) of the 527 respondents reported their School Nutrition Region (SNR), with similar response rates across regions. Responses ranged from 9% to 12% (Figure 4), indicating a representative sample was obtained from across the state. By region, the most responses came from region 9 (13.3%; n=65); the least number of responses came from Region 4 (n=38; 7.8%). Forty (7.6%) participants chose not to disclose their SNR (Figure 4).

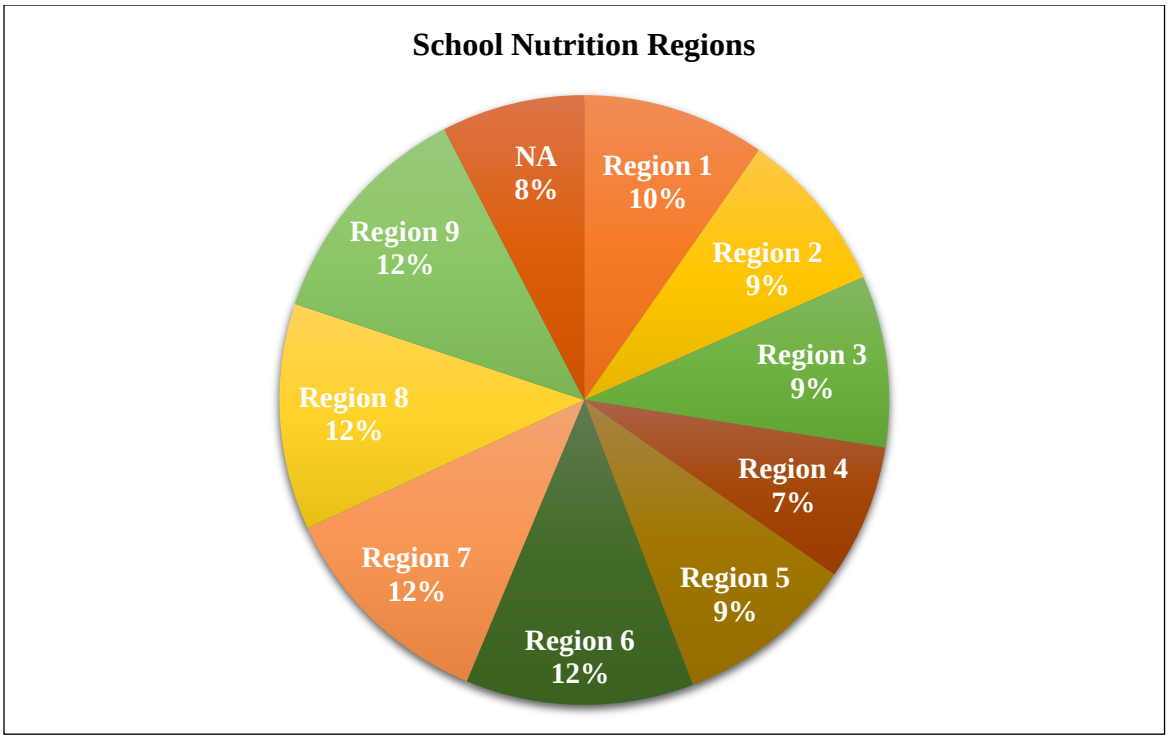

Figure 4. Distribution of the Responses by School Nutrition Region (n=487).

RQ #1: Prevalence of Recess Before Lunch

The first research question in this study addressed the question: "What percentage of elementary schools in Indiana schedule recess before lunch?" Of the 527 principals who responded to the survey, more than two-thirds (69.3%; n = 365) indicated they follow the traditional pattern of scheduling recess after lunch. Slightly less than one-third (30.7%; n = 162) indicated they schedule recess *before* lunch (Figure 5).

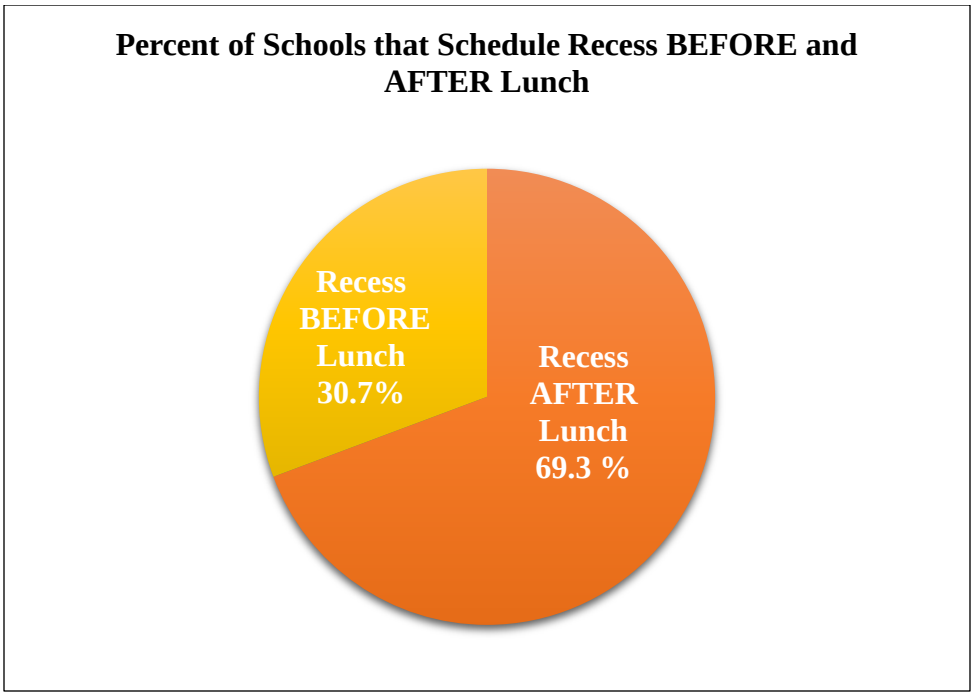

Figure 5. Percent of Schools that Schedule Recess BEFORE and AFTER Lunch (n=527)

RQ# 2: Factors that Prevent Administrators from Scheduling Recess Before Lunch

The second research question in this study addressed the question: "What factors prevent school administrators from scheduling recess before lunch?" To examine this question, results from those principals who schedule recess after lunch will be analyzed.

Demographics of Schools that Schedule Recess After Lunch

Of the 365 (69.3% of total) schools that indicated they schedule the traditional recess after lunch, 75.3% (n=275) were public schools, 17.5% (n=64) were private schools, 2.5% (n=9) were identified as "other," and 4.7% (n=17) of the respondents choose not to disclose their type of school (Table 2).

By income level, using the percent of students receiving free or reduced lunch as a proxy, a mid- to low-percent of students receiving free or reduced lunch was the most common response

(21.9%; n= 80), followed by mid-high (19.7%; n = 72). There was an even divide between the two extremes of poverty (i.e., low percent of free and reduced [12.1%; n=44] and high percent of free and reduced [11.8%; n=43]). Over a third of schools (34.5%; n= 126) chose not to disclose the percent of students on free or reduced lunch (Table 2).

Of the schools that scheduled recess after lunch, almost half were located in a rural area (40.5%; n= 148), with the remainder located in an urban area (25.5%; n = 93) or suburban area (28.8%; n = 105). A small percentage of principals chose not to disclose their geographic location (5.2%; n= 19). Scheduling recess after lunch was relatively evenly divided across the Indiana School Nutrition Regions, ranging from 7.1% of the responses in Region 4 to 12.3% in Region 9 (Table 2).

Table 2. Demographic Characteristics of Schools that Schedule Recess AFTER Lunch (n=365).

	n	%
Type of School		
Public	275	75.3
Private	64	17.5
Other	9	2.5
Prefer Not to Disclose	17	4.7
Poverty Level		
Low	44	12.1
Mid-Low	80	21.9
Mid-High	72	19.7
High	43	11.8
Prefer Not to Disclose	126	34.5
Location		
Urban	93	25.5
Suburban	105	28.8
Rural	148	40.5
Prefer Not to Disclose	19	5.2
School Nutrition Region		
Region 1	36	9.9
Region 2	33	9.0
Region 3	31	8.5
Region 4	26	7.1
Region 5	33	9.0
Region 6	51	14.0
Region 7	43	11.8
Region 8	43	11.8
Region 9	45	12.3
Prefer Not to Disclose	26	6.6

Barriers that Prevent Scheduling Recess Before Lunch

Principals who currently offer recess after lunch (n=365) were asked to indicate what barriers, if any, prevented them from scheduling recess before lunch (Figure 6). From the list provided, the most common barrier was the need to revise the daily schedule (27.7%; n= 101), followed by academic hours (27.1%; n= 99), lack of staffing (18.6%; n= 68), inadequate space in

the lunchroom and playground (15.1%; n= 55), handwashing procedures (14.2%; n= 52), and breaking of tradition (12.6%; n= 46). Other barriers indicated included preservation increased time between breakfast and lunch (5.2%, n= 19), unaware of research on the topic (3.8%, n= 14), resistance from food service staff (2.7%; n= 10), resistance from parents (1.6%; n= 6), and the need to communicate more with staff (0.8%; n= 3). Only 10.1% (n= 37) of participants indicated they did not experience ant barriers (Figure 6). Over one-third of the principals (36.7%; n= 134) provided additional barriers that were not included on the list in the survey (Table 3).

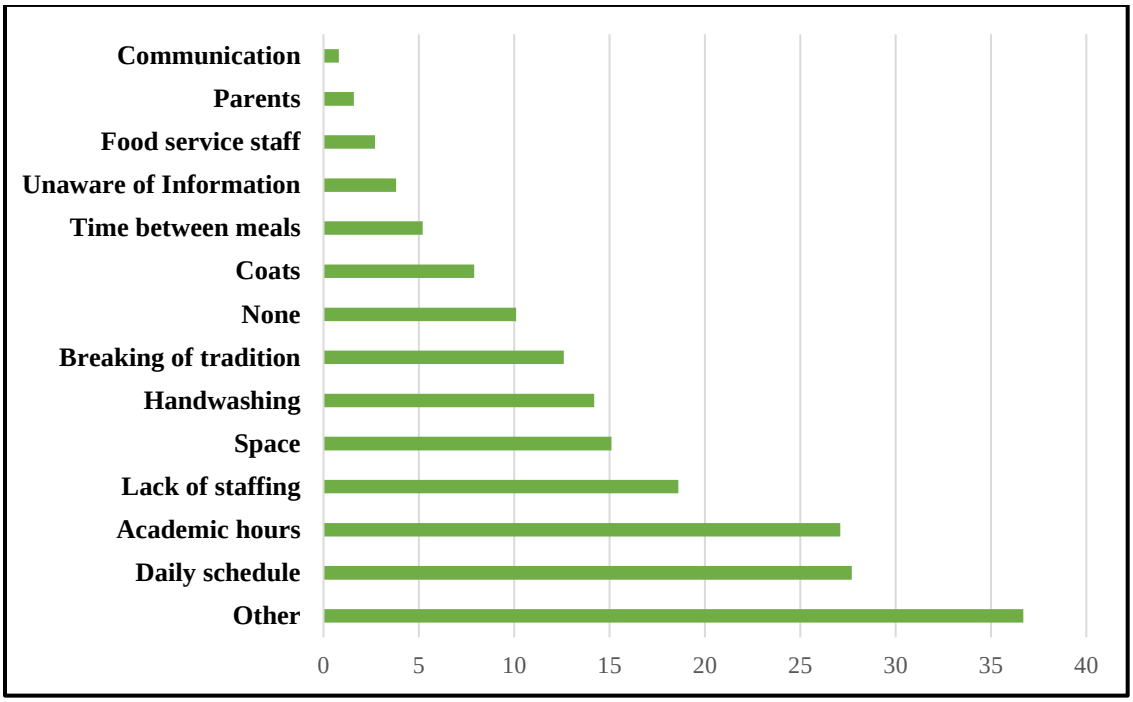

Figure 6. Barriers that Prevent Schools Principals from Scheduling Recess BEFORE Lunch by Percent of Responses (n=365).

Comments Regarding Barriers to Implementing Recess Before Lunch

Other barriers mentioned by those who do not schedule recess before lunch included: a) previous failed attempt of recess before lunch; b) never considered it; c) schedule would interrupt

reading blocks; d) cafeteria and playground not fit for schedule; e) adequate time for cafeteria clean-up; and f) scheduling issues (Table 3).

Table 3. Representative Comments Regarding Barriers to Implementing Recess BEFORE Lunch.

• All of our students have a morning recess separate from the lunch recess. We did try this a few years back and K-2 students struggle to "sit" and wait on others, so we had many more behavior issues during lunch.
• Never thought about it.
• The area used for lunch is also used for PE which starts right after recess. Recess and then lunch gives us no time to clean the area for PE.
• We have breakfast in the classroom at 9 and our lunches begin at 10:50. There is not even 2 hours in between and I need to focus on uninterrupted reading blocks before lunch.
• Our lunch periods are only offered at certain times of the day.
• We had recess before lunch last year, and we saw increased behaviors in the cafe and loss of instructional time to deal with these issues later in the day.
• Improper design of cafeteria, we would need two lines, not one.
• By allowing students to play before they eat, they would have to come in and wash their hands. They would have to do something with their coat and then go eat. This would take more time away from the academics. As is now they eat for 20 minutes and play outside for 20 minutes.
• We have done this previously and saw no impact.
• I only have a small window of time for my cafeteria staff to serve and clean up - they have to be here early for breakfast - so I have to have them serve early to be able to get everything done before they leave.
• We share facilities with grades 7-12 and their lunches dictate our schedule.
• We tried this. Many students did not eat as much lunch because they were hot and wound up from running around at recess. They then complained to teachers and parents about being hungry in the afternoon (presumably because they didn't eat enough of their lunch).

Perceived Benefits from Implementing a Recess before Lunch Policy

Participants who did not schedule recess before lunch were asked about their perception of the benefits of a recess before lunch policy. Despite not offering recess before lunch, only 11.5% (n= 42) of the principals saw no perceived benefits in scheduling recess before lunch. The perceived benefit most indicated by principals was the increased consumption of lunch (58.1%; n= 212), followed by increased focus on lunch (38.9%; n= 142), improved behavior in the cafeteria (37%; n= 135), decreased plate waste (28.5%; n= 104), increase attention during class (17.8%; n= 65), increased consumption of healthful foods (15.9%; n= 58), improved behavior on the playground (11.8%; n= 43), and increased time to consume lunch (7.9%; n= 29). The least indicated perceived benefit was decreased lunch line wait time (4.4%; n= 16). Some principals (14.2%; n= 52) indicated other perceived benefits not listed on the survey (Figure 7).

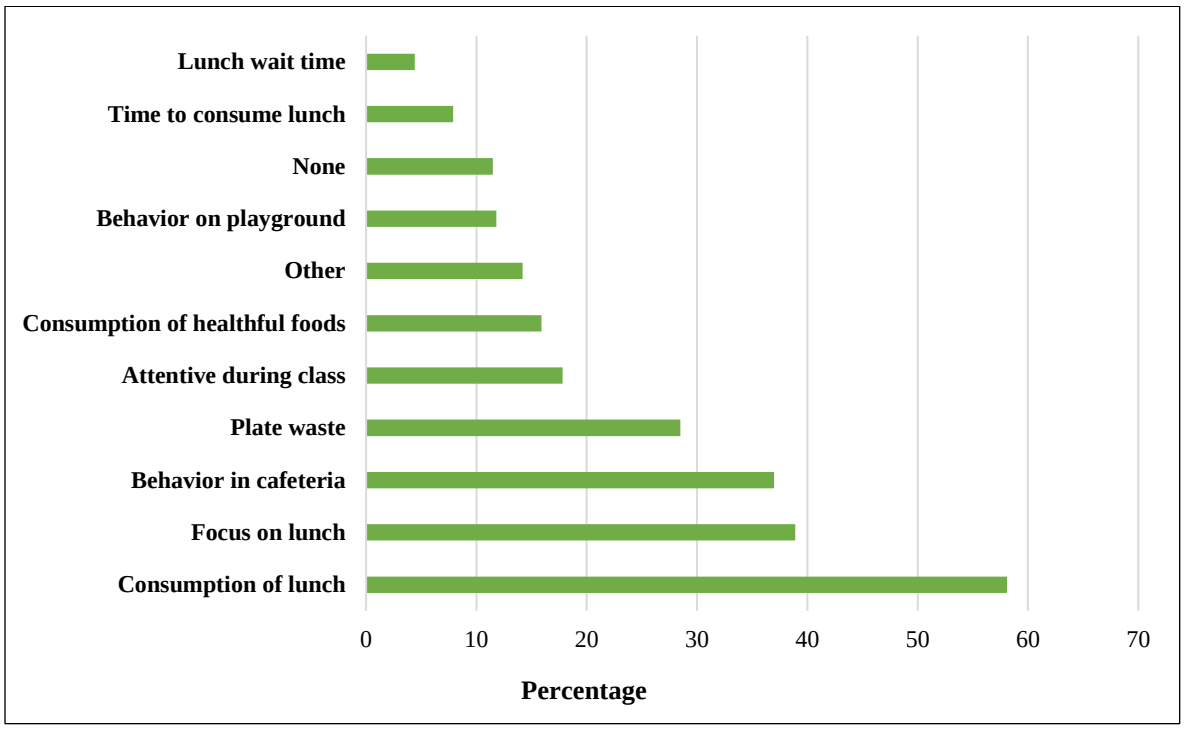

Figure 7. Perceived Benefits of Scheduling Recess before Lunch by Principals Who Currently Schedule Recess AFTER Lunch (n=365).

Comments Regarding Perceived Benefits from Implementing a Recess before Lunch Policy

Other perceived benefits mentioned included: a) using lunch as a "calming" time; b) uncertain on the benefits; c) increase of student's appetite; d) recess discipline could be dealt with during lunch time instead of during instructional time; and e) no benefits experienced when having recess before lunch in the past. Table 4 depicts representative comments from participants on perceived benefits of scheduling recess before lunch.

Table 4. Representative Comments Regarding Perceived Benefits of Implementing Recess BEFORE Lunch

• When I did this before it seemed that the students got their wiggles out before lunch then used lunch as a calming time. It provided a smoother and calmer transition back to class.
• Reduced behavior problems by the time they return to class afterwards.
• These were the benefits we saw last year, but they didn't outweigh the negatives.
• Avoid possible disruptions that recess bring into the classroom, at times lunch helps them decompress and relax before going back to class.
• Uncertain.
• Recess drama would be minimized or forgotten by the time they get back to class.
• Possibly increased student appetites (they eat more of their lunches).
• None of these benefits materialized when we tried it.
• I am unsure because we have never done it. I imagine that some of these would be true, but I am unsure and have not researched it either.
• Allows to clear the mind and support the importance with any form of movement.
• Recess discipline could be dealt with during the student's lunch time rather than pulling them out of afternoon math class.

Despite not currently scheduling recess before lunch, the vast majority of participants indicated that they would *consider* scheduling recess before lunch (81.4%; n = 297) (Figure 8).

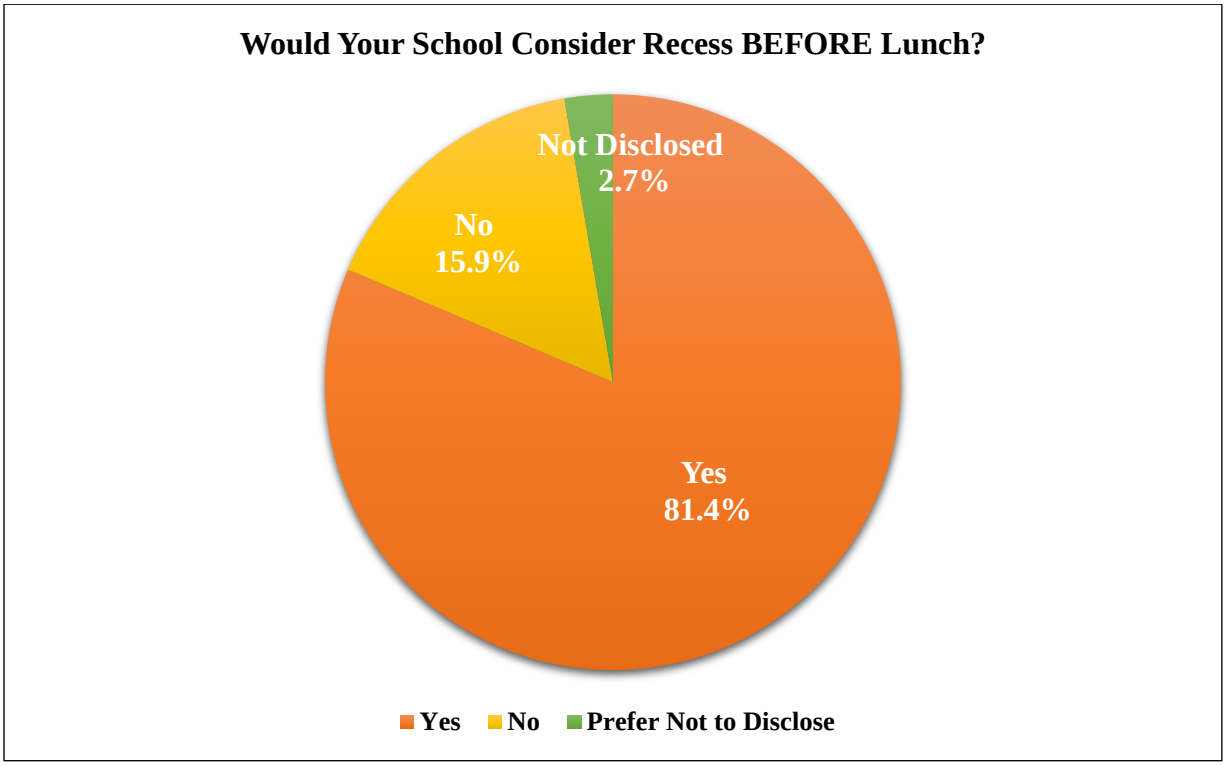

Figure 8. Percent of Principals Who Currently Schedule Recess after Lunch Willing to Consider Scheduling Recess BEFORE Lunch (n=365).

More than half of the principals (53.4%; n= 195) indicated that they were unaware of the research surrounding recess before lunch. A small percentage of respondents (4.9%; n= 18) chose not to disclose whether or not they were aware of research surrounding the topic (Figure 9).

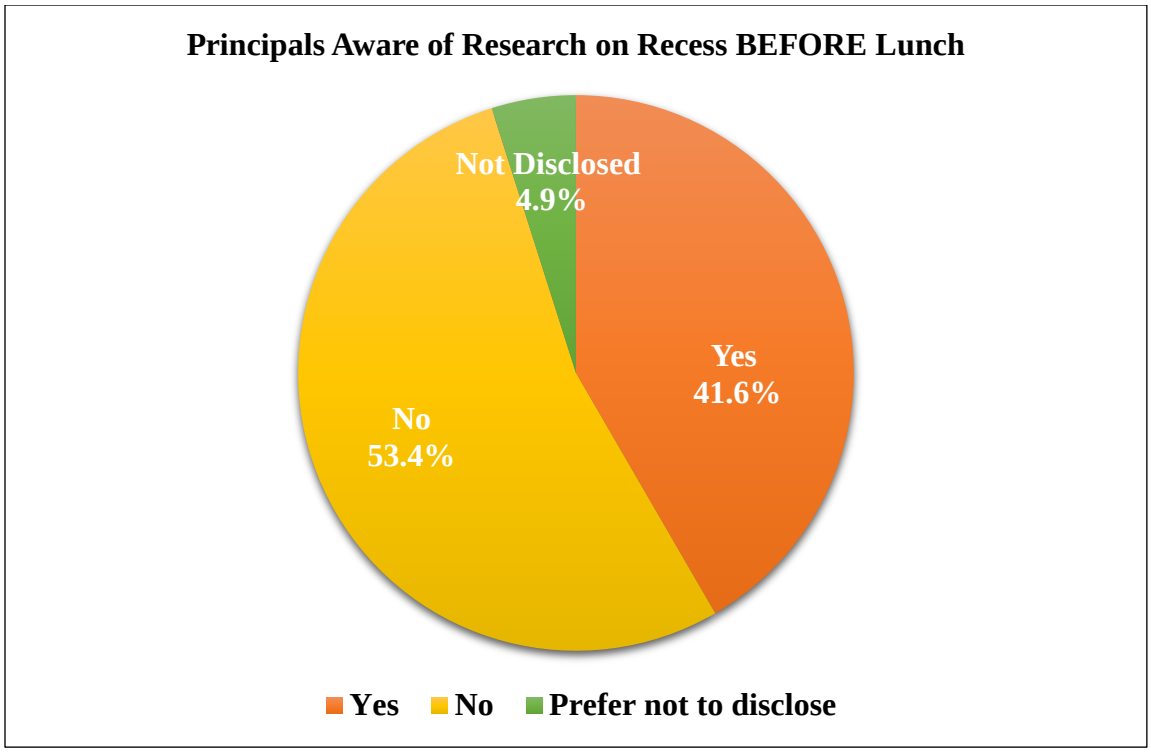

Figure 9. Percent of Principals Who Schedule Recess AFTER Lunch Who are Aware of Research Regarding Benefits of Scheduling Recess BEFORE Lunch (n=365).

Schools Scheduling Recess Both Before *and* After Lunch

Fifty-seven (16%) of the 365 principals who selected "recess after lunch" from the dichotomous options "recess before" or "recess after" lunch indicated in the comment section of the survey that, while the majority of their classes had recess after lunch, they *also* schedule recess before lunch in one or more of their classes. Barriers to scheduling recess before lunch for all grades included: a) inadequate space on playground; b) bringing muddy clothes into the cafeteria from the playground; and c) scheduling issues. One school stated they change the recess schedule each year and 2017-18 was an "after" year. Table 5 depicts representative comments from participants on the barriers of scheduling recess before lunch for all grades.

Table 5. Comments about Barriers from Schools that offer Recess BEFORE and AFTER Lunch.

• I've done recess before lunch and it was fine. Scheduling and trying to get as much academic time in before lunch is our goals. We also have recess separate from lunch because of space issues on playground. Not all grade levels have recess before or after lunch.
• We've addressed any "barriers"...our biggest issue is during winter months when kids come in from recess & go straight to lunch with their snowy boots, snow gear, etc. It creates a huge mess in the cafeteria.
• Some grade levels schedule right before, some right after, and one grade level schedules middle of the afternoon. I support recess for our students and so there is no limit to how many they have.
• We have alternated before and after. This is an 'AFTER' year.

Benefits of scheduling recess before lunch mentioned from this group of principals who offer recess both before and after lunch included: a) being able to stagger lunch and recess for safe amounts of students on the playground; and b) no benefits observed from either schedule. Table 6 depicts representative comments of the benefits of recess before lunch for those who have both schedules.

Table 6. Representative Comments of Benefits from Schools that have both Schedules.

• I'm not sure that there is much difference between recess before or after lunch.
• Benefits for my school are staggering the usage of the one playground so that there are not too many students on the playground at any one time.
• In four years of splitting both before and after, I see no conclusive evidence either way except for more thirst when recess is before lunch as they play so hard or the weather is hot.
• I have not actively observed any more benefits for either AM recess or PM recess.

RQ#3: Benefits, Barriers, and Feedback of Scheduling Recess Before Lunch

The third research question addressed those schools that currently schedule recess before lunch in an effort to identify benefits, barriers, types of feedback obtained, and whether or not these principals would recommend making this scheduling change to other schools.

Demographics of Schools Scheduling Recess Before Lunch

Of the 162 schools (30.7% of total) that scheduled recess before lunch, 69.1% (n=112) were public and 21% (n=34) were private (Table 7). By income level, using the percent of students receiving free or reduced lunch as a proxy, the highest percent of responding schools had a mid-high (19.8% ;n = 32) to a mid-low (19.1%; n = 31) percent of students who received free or reduced lunch (Table 7). Only 8% (n=13) of the schools that scheduled recess before lunch were considered low income (i.e., a high percent of free and reduced lunch students). Over one-third (38.9%; n=63) of the schools chose not to disclose the percentage of students on free and reduced lunch.

By location, more of the schools that scheduled recess before lunch were from suburban (34.6%; n= 56) or rural (32.7%; n = 53) areas than urban areas (24.1%; n = 39). Fourteen schools (8.6%) of the schools that scheduled recess before lunch chose not to disclose their area of location (Table 7).

Scheduling recess before lunch was relatively evenly divided across the Indiana School Nutrition Regions, ranging from 8.0% of the responses in Region 6 to 12.3% in Regions 8 and 9 (Table 7). Overall, the response rate by Indiana School Nutrition Region was as follows: 9.3% (n = 15) from region 1, 8% (n = 13) from region 2, 10.5% (n = 17) from region 3, 7.4% (n = 12) from region 4, 10.5% (n = 17) from region 5, 8% (n = 13) from region 6, 11.7% (n= 9) from

region 7, 12.3% (n = 20) from region 8, and 12.3% (n = 20) from region 9. Almost ten percent (9.9%; n = 14) of the respondents chose not to disclose their school nutrition region. (Table 7).

Table 7. Demographic Characteristics of Schools Scheduling Recess BEFORE Lunch (n=527)

	n	%
Type of School		
Public	112	69.1
Private	34	21
Other	3	1.9
Prefer Not to Disclose	13	8.0
Poverty Level		
Low	23	14.2
Mid-Low	31	19.1
Mid-High	32	19.8
High	13	8.0
Prefer Not to Disclose	63	38.9
Location		
Urban	39	24.1
Suburban	56	34.6
Rural	53	32.7
Prefer Not to Disclose	14	8.6
School Nutrition Region		
Region 1	15	9.3
Region 2	13	8.0
Region 3	17	10.5
Region 4	12	7.4
Region 5	17	10.5
Region 6	13	8.0
Region 7	19	11.7
Region 8	20	12.3
Region 9	20	12.3
Prefer Not to Disclose	16	9.9

Grade Level

Of those schools who schedule recess before lunch, the majority (57.4%, n = 93) only schedule recess before lunch for *select grades*. As indicated in Figure 10, those grades more

likely to have recess before lunch are students in first (32.1%; n = 51), second (31.5%; n = 51) or third grades (30.9%; n = 50), followed by kindergarten (29%; n = 47), fourth grade (29%; n=47), fifth grade (28.4%; n = 46). Students in sixth grade (13%; n = 21) are least likely to have recess before lunch (Figure 10).

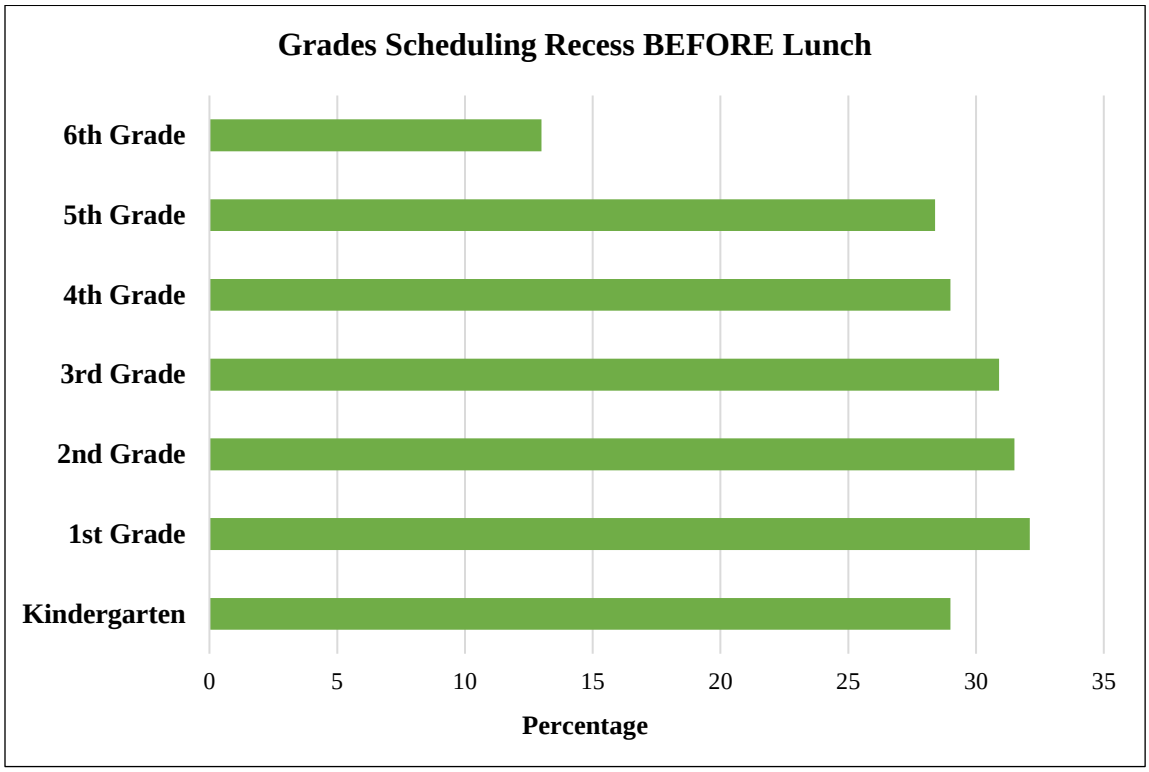

Figure 10. Grades Scheduling Recess BEFORE Lunch (n=162).

Behaviors Associated with Recess Before Lunch

Participants were asked to select benefits and/or behaviors exhibited by students who participated in recess before lunch. Most principals agreed that the increased consumption of lunch is a benefit in scheduling recess before lunch (51.9%; n = 84). Other benefits indicated included: improved behavior in the cafeteria (45.1%; n= 73), increased focus on consuming lunch (37%; n= 60), students more attentive during class (28.4%; n= 46), decreased plate waste

(26.5%; n= 43), increased time to consume lunch (18.5%; n= 30), improved behavior on the playground (17.9%; n= 29), increased consumption of healthful foods (13.6%; n= 22), and decreased student wait time in lunch line (10.5%; n= 17). About a fifth of the participants (20.4%; n= 33) listed other benefits witnessed from scheduling recess before lunch. (Figure 11). Only 9.3% (n = 15) of principals stated they saw no benefits from scheduling lunch before recess.

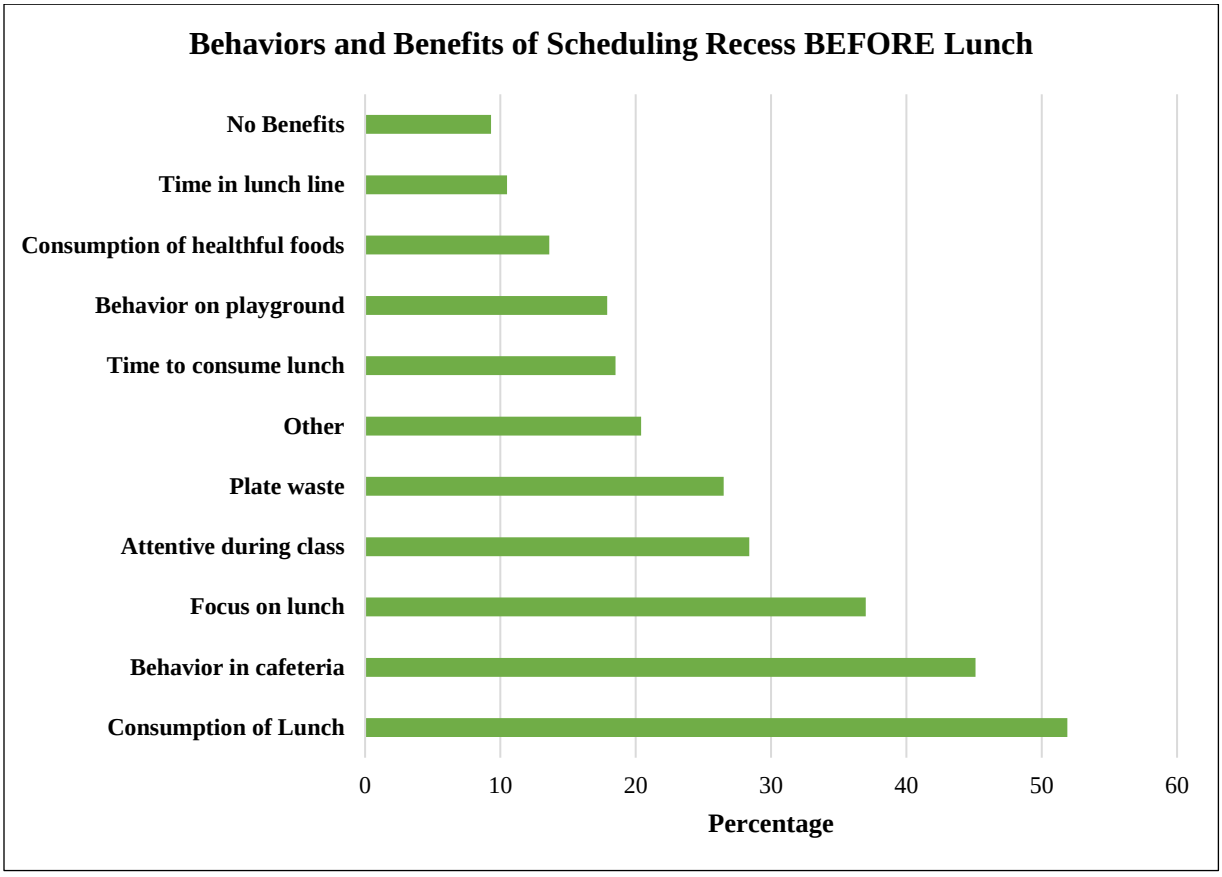

Figure 11. Behaviors and Benefits of Scheduling Recess BEFORE Lunch (n=165).

Comments on Benefits of Recess Before Lunch

Participants were asked to list any other benefits they had witnessed when a recess before lunch policy was implemented. Positive, neutral, and negative comments were received from participants about their experienced with scheduling recess before lunch (Table 8). Positive themes identified include: a) less stomach aches on the playground leading to decreased nurse visits; b) smoother transitions to the classroom; c) fewer conflicts brought into the classroom from the playground; d) students are more likely to calm down and eat lunch; and e) students who need to stay and finish work are able to as that time cuts into recess and not lunch (Table 8).

Table 8. Representative Comments of Benefits of Recess BEFORE Lunch (n=165).

Positive

- Transitioning from cafeteria to class is instead of cafeteria to recess allows for improved supervision and smoother transitions.
- Children don't have full bellies running around.
- Students have been sitting all morning, then they have chance to run and play and then have lunch and it gives them time to settle in before afternoon classes.
- Fewer students vomiting on the playground (seriously!).
- Students who need to finish work up cut into recess instead of lunch.

Neutral

- That is the way the schedule worked out.
- We have just started, so it is too early to tell.

Negative

- I honestly cannot say I see a difference because we still have all of these issues above and I have never seen this school WITHOUT recess before lunch, therefore, I have nothing to compare it to.
- Run into issue with weather and indoor recess.

Negative comments included: a) no benefits seen in scheduling recess before lunch; b) more problems with recess before lunch than recess after lunch; and c) problems when weather forces recess inside. Table 8 depicts representative comments of experiences with recess before lunch.

School's Decision to Schedule Recess Before Lunch

Participants were asked what influenced them to schedule recess before lunch. Most of the principals stated research on the topic of recess (37%; n= 60) was the largest influence followed by school faculty or staff (22.8%; n = 37). In a few cases (2.5%; n= 4), the principals indicated the School Board or School Commission influenced the decision. A few principals (3.7%; n= 6) indicated they were unsure of what influenced the decision to implement their recess before lunch policy. One-quarter of the respondent (25.3%; n = 41) indicated the recess before lunch policy was already in place when they became principal. Fifty principals (25.3%) stated their influence came from other sources not indicated on the list of options. No principal stated their school parents influenced the decision to schedule recess before lunch (Figure 12).

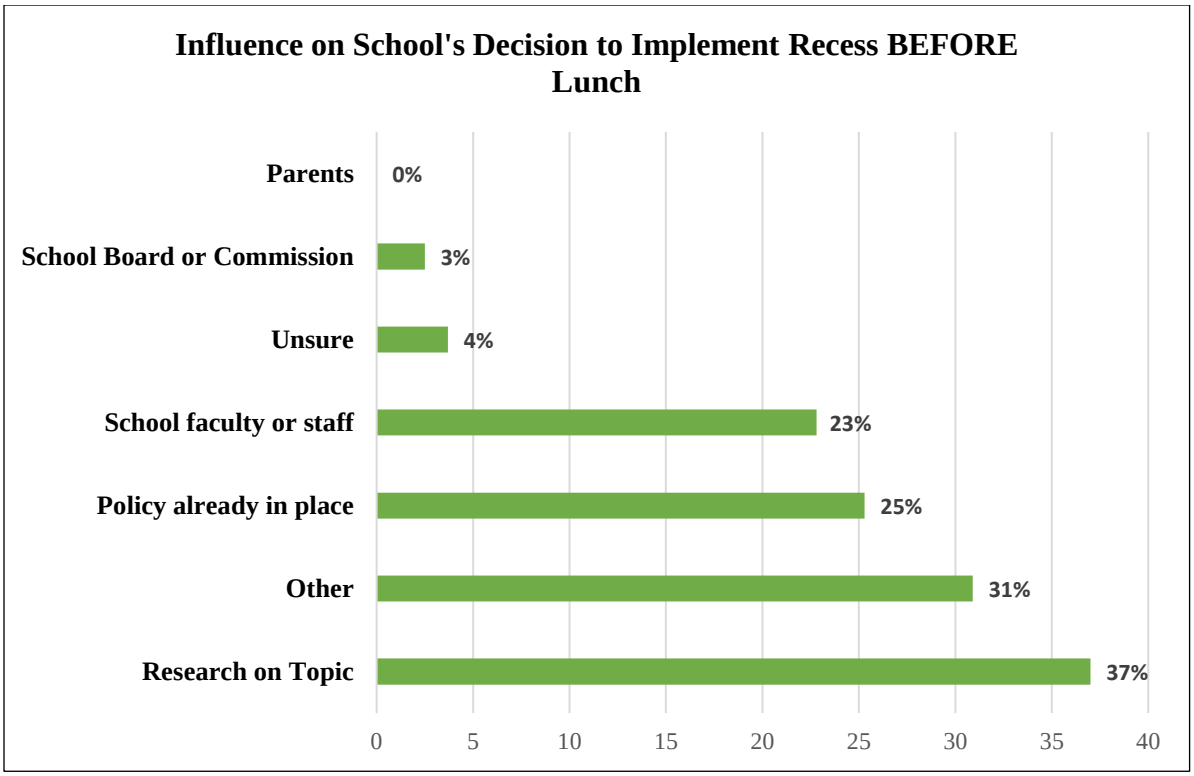

Figure 12. Influences on School's Decision to Implement Recess BEFORE Lunch (n=162).

Comments on Decision to Implement Recess Before Lunch

Comments gathered from participants who shared more information about their decision to implement recess before included themes such as a) scheduling needs; b) suggested by school nurse; c) knowing the benefits; d) separation of classes on playground; e) needing to break up the morning; f) policy was already in place; and g) suggested by food service staff. Table 9 depicts a representation of comments received by participants on their influences to schedule recess before lunch.

Table 9. Representative Comments of Decision to Implement Recess BEFORE Lunch

- I have had recess before lunch in other buildings where I worked.
- The number of students needing to eat makes us schedule two periods back to back.
- Based on scheduling of 90-minute reading block, specials (when I could get teachers from other building), and cafeteria hours, this was the best way I could figure schedule to work out. I'd be open to changing it, but also thought by then students needed a chance to run and pushing recess back even further wasn't a good option either.
- School nurse and another principal presented to the board who then adopted it.
- Part of the wellness policy.
- Suggestion from the Food Service Department.
- It helped make our lunch schedule be more efficient. It also kept the little ones and the big kids separate on the playground.
- Our school nurse was having a large number of visits from students with stomach issues.
- Past principal worked to create a schedule in this way. I was an assistant principal involved in this process. We have a school committee committed to making changes in procedures like this one.

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Barriers Encountered When Implementing Recess Before Lunch

Participants who have a recess before lunch policy were asked what common barriers were encounter when implementing their policy (Figure 13). The most indicated barrier was revision of the daily schedule (35.2%; n= 57), while the least indicated barrier was resistance from food service staff (1.2%; n= 2). Other barriers included hand washing procedures (18.5%; n= 30), breaking of tradition, inadequate space in lunchroom or playground (14.8%; n= 24), lack of staffing for student supervision (11.7%; n= 19), time for students to get coats during cold weather (11.7%; n= 19), resistance by teachers (7.4%; n= 12), preservation of academic hours (6.2%; n= 10), increased need for communication between school staff (3.7%; n= 6), increased

length of time between breakfast at home and lunch (3.7%; n= 6), and resistance from parents (3.1%; n= 5). Some principals (13.6%; n= 22) listed other barriers experienced during the implementation of recess before lunch. (Table 10).

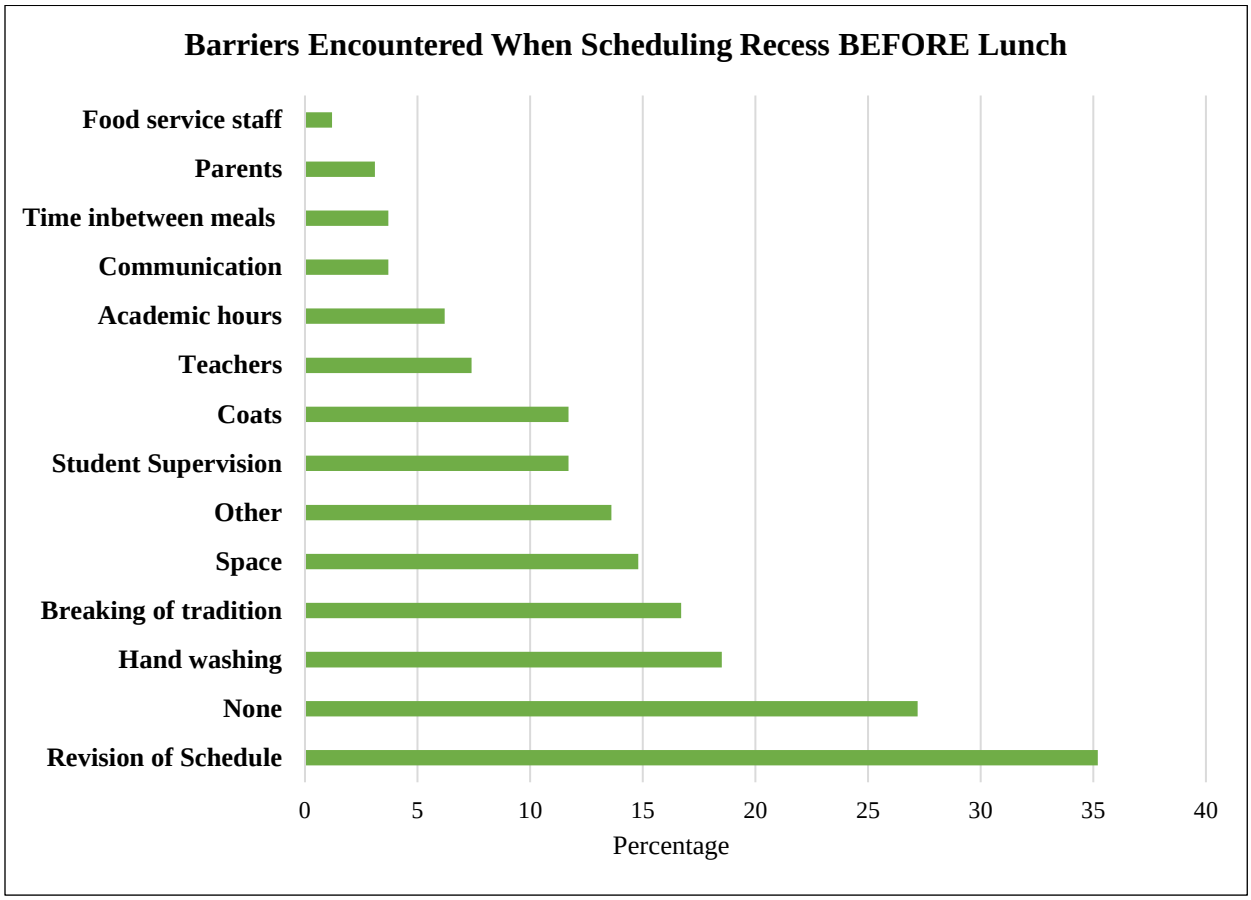

Figure 13. Barriers Encountered When Scheduling Recess BEFORE Lunch.

Comments from Barriers Associated with Implementing Recess Before Lunch

Other barriers participants mentioned were: a) resistance by playground supervisors; b) winter clothes in lunchroom during winter month; c) students bringing mud into the cafeteria from the playground; d) restroom usage; e) students becoming hungry due to long morning

schedule; and f) implementing involved a lot of discussion and planning. Table 5 depicts representative comments received from participants about the barriers they encountered when implementing recess before lunch.

Table 10. Representative Comments of Barrier Encountered when Implementing Recess BEFORE Lunch.

- None- once it was scheduled everyone adjusted.
- Having recess clothes in lunchroom during winter months. Increases slush indoors during winter months.
- Children hungry after even at-school breakfasts.
- Early recess for younger students makes for a very long afternoon academically.
- Moving a large group of students through the restrooms to wash hands and what to do with snow boots in the winter time.
- Lots of discussions and working through details

.

Success Stories and Advice

Those who scheduled recess before lunch were asked if they were willing to share a success story. Themes found from analyzing the success stories include: a) ensuring everyone agrees with the decision; b) sharing research with parents, staff, and students; c) the importance of communication; d) restructuring of how students enter and exit the cafeteria or playground; and e) adding hand sanitizer or baskets to put coats at the entrance of the cafeteria. Table 11 depicts representative comments from participants on their success stories of implementing recess before lunch.

Table 11. Representative Comments of Success Stories Related to Implementing a Recess BEFORE Lunch Policy.

- Sharing the research with teachers, parents, and students was the only thing necessary. And the attitude that "the schedule works for us; we do not work for the schedule.
- The area by our recess doors now are equipped with hand cleaning dispensers. One tap and the kids wash their hands before going to lunch.
- As the new principal to the building I spoke to the stakeholders who would be impacted by my decision. I explained my position and asked for input from others. I explained that we were going to make the change to recess before lunch and then re-evaluate this decision in a few weeks. There wasn't any negative feedback from the change.
- We communicated, communicated, communicated and gave much praise for families who sent in snacks for the morning. Soon kids were eating more school breakfasts and more at their houses for breakfasts allowing most families to avoid having to send in snacks. We also now have universal breakfast and lunch, so there are never children who forget a breakfast or lunch who are charged for doing so. It's also resulted in parents commenting about how their kids eat vegetables now.
- We just had to think outside of the box and try different things to make it work. The kids get Germ-X when they enter the cafeteria after recess. We came up with a plan to drop coats off in the hallway outside their classroom on the way to the cafeteria. We put laundry baskets by the doors for students to place lunch boxes prior to going to recess and they pick them up coming in from recess to go to lunch. We have made it work with a lot of team work and positive attitudes. I really do not know if having lunch after recess has any impact one way or another but we make it work.
- To solve these problems, we tweaked a few things: we installed hand-sanitizer dispensers at the start of the serving lines in the cafeteria and eliminated the stops in the hallway. We also re-vamped our serving line so that it does not matter what order students come into the cafeteria. These things allow our support staff to reward students who have lined up quietly by allowing them to lead the line to lunch first. Or, they can separate disorderly students and put them at the end of the line if needed. By walking directly to lunch with no stops, and with a more flexible line-up, we greatly decreased the opportunity for misbehavior, and our line also runs more efficiently.

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Participants were also asked to provide advice to those schools who want to implement a recess before lunch policy. Themes of advice included: a) explain reasoning to staff; b) the benefits are worth the change; c) communication is important; d) allowing students to bring snacks if possible; e) have backup plan for indoor recess; and f) allow students time to finish

their lunch. Table 12 depicts representative comments of advice received from participants scheduling recess before lunch.

Table 12. Representative Comments related to Advice about how to Implement a Recess BEFORE Lunch Policy.

- Just scheduled it and explain the necessity to your staff. As long as they understand the reasoning, they all should buy in.
- Read the research and have a control group to monitor the behavior and the amount of food eaten and you will change.
- Just that transitioning from cafeteria to class reduced behavior issues rather than transitioning from cafeteria to recess when it's more likely instructional assistants monitoring instead of certified staff. Students are more ready to eat after recess and later in the day. We serve universal breakfast, so students are more ready to eat after vigorous activity and later in the day.
- Our school used to have recess right after lunch, and I am very glad that we made the switch to having recess before lunch. There is far less food waste, as children are no longer rushing through lunch to get to recess. The children work out their energy during recess, which results in better lunchroom behavior. Also, students used to vomit frequently on the monkey bars, slide and swings because they had just consumed lunch, a problem that is now eliminated. It was, without question, the right move for our school.
- Make sure you have buy-in from the staff before implementing. If scheduling allows, try it with your first lunch period for a while and then allow those teachers to share at a staff meeting their thoughts\
- This has greatly decreased discipline problems at recess and students eat more and drink more milk. They are calmer and ready to go back to class to work after lunch. Discipline issues can be taken care of during lunch, so students don't miss class time.
- Communicate, watch, rework as needed, watch, report, communicate, and celebrate your achievements!
- We found that it was too long from when kids ate breakfast until lunch so all teachers K-6 allow students to bring a snack to eat midmorning. We also allow water bottles in the classroom. This has helped tremendously.
- Have a plan for indoor recess due to inclement weather/rain.
- Always allow students to stay longer and finish their lunch.

Feedback from Recess Before Lunch

Much of the feedback received by the principals from parents, students, and staff regarding scheduling recess before lunch was primarily positive or neutral. Feedback from parents was mostly neutral (58%; n= 94); only two principals (1.2%) indicating they had received negative feedback from parents. One in five principals (22.2%; n= 36) indicated they had received positive feedback from parents. Over half of the principals (50.6%; n= 82) indicated they had received positive feedback from the staff, with only six (3.7%) principals indicating they had received negative feedback from staff, with the remaining principals (27.8%; n= 45) indicating neutral feedback from the staff. Feedback from students was mostly neutral (42.0%; n= 68); only three (1.9%) principals indicated they had received negative feedback from the students. Over one-third of the principals (38.3%; n= 62) indicated they had received positive feedback from students (Figure 14).

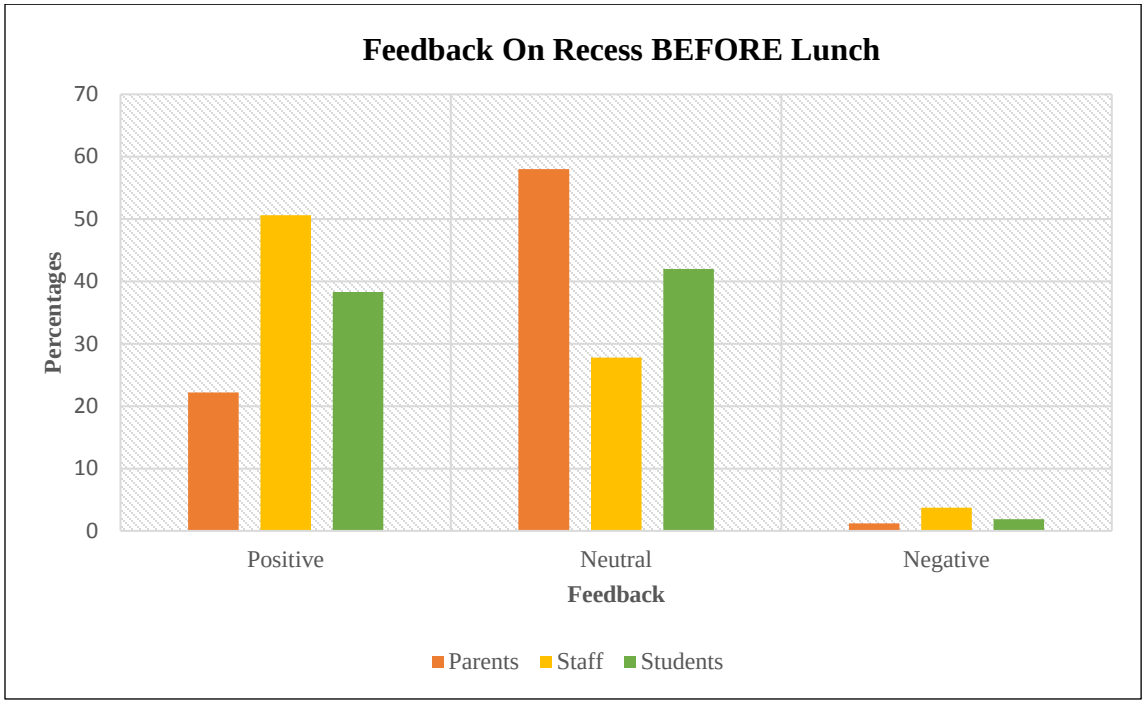

Figure 14. Feedback on Recess BEFORE Lunch (n=162).

The majority of principals (82.1%, n= 133) stated they would recommend scheduling recess before lunch to other schools; only 5.6% (n = 9) stated they would *not* recommend the schedule change. The remaining participants chose not to disclose their opinion (12.3%; n= 20). (Figure 15).

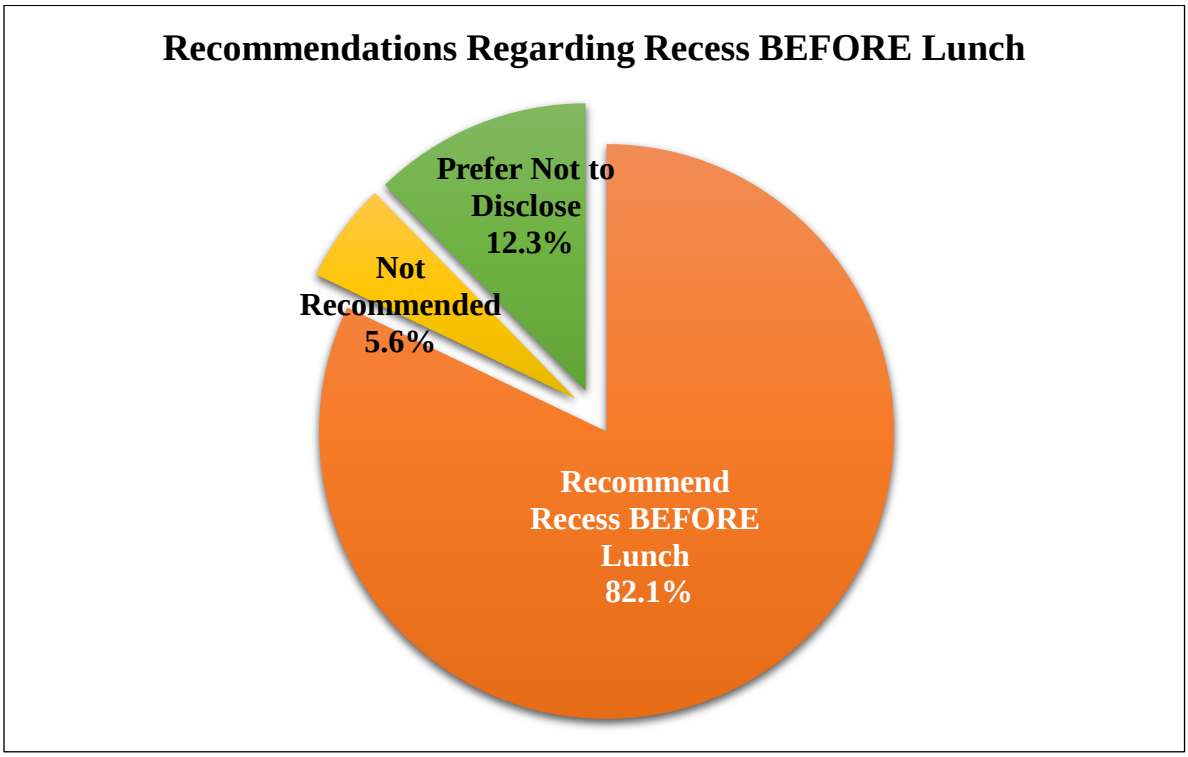

Figure 15. Percent of Respondents who would Recommend Recess BEFORE Lunch (n=162).

RQ #4: Differences in Responses Based on a School's Characteristics

The fourth research question addresses whether or not there were differences in the responses received by the principals based on the: a) location of the elementary school (i.e., rural, town, suburban, and urban), b) School Nutrition Association district, c) designation as

public versus private elementary schools; and d) percentage of students on free and reduced lunch.

Chi square analysis indicated there was no difference ($p = 0.220$) in the percent of schools that offered recess before lunch compared to after lunch based on the location of the school (i.e., urban, suburban, or rural location) (Table 13). Similarly, there was no difference in the percent of schools that offered recess before lunch compared to after lunch based on the school's School Nutrition Region ($p = 0.843$) (Table 13). In addition, there was no significant difference ($p = 0.502$) between when schools scheduled recess and whether the school was public or private (Table 13). Lastly, no significant difference was found between when schools scheduled recess by the percent of students who received free or reduced lunch (i.e., a proxy for poverty level) ($p = 0.566$) (Table 13).

Using the average number of students enrolled in public (389) and private (162) elementary schools in Indiana (https://www.doe.in.gov/accountability/find-school-and-corporation-data-reports), public and private schools were categorized into average/low enrollment (≤ 389 students for public; ≤ 162 students for private) and high enrollment (>389 for public; > 162 for private) to determine if there was a relationship between school size and when recess was scheduled. Results indicate no differences between average/low enrollment and high enrollment compared to when recess was schedule for either public ($p = 0.266$) or private schools ($p = 0.805$) (Table 13).

Table 13. Scheduling of Recess Based on Location, School Nutrition Region, Type of School, Poverty Level, Enrollment, and Number of Lunch Periods (n=529).

	N	Recess Before	Recess After	p
Location				
Urban	132	39	93	0.220
Suburban	161	56	105	
Rural	201	53	148	
School Nutrition Region				
Region 1	51	15	36	0.843
Region 2	46	13	33	
Region 3	48	17	31	
Region 4	38	12	26	
Region 5	50	17	33	
Region 6	64	13	51	
Region 7	62	19	43	
Region 8	63	20	43	
Region 9	65	20	45	
Type of School				
Public	387	112	275	0.502
Private	98	34	64	
Other	12	3	9	
Poverty Level				
Low	77	27	50	0.502
Mid-Low	116	31	85	
Mid-High	96	29	66	
High	50	12	38	
Enrollment- Public Schools				
Low/Average	146	47	99	0.266
High	238	64	174	
Enrollment- Private Schools				
Low/Average	44	16	28	0.805
High	53	18	35	
Number of Lunch Periods				
1	35	5	30	
2	71	32	39	**0.021***
3	136	39	97	
4	78	27	51	
5	66	21	45	

There was, however, a difference (p = 0.021) between the number of lunch periods offered and the timing of recess. The adjusted residual was used to find where the significance was between the lunch periods. Schools having only one lunch period were more likely to have recess after (n= 5, AR= 2.4), compared to before, lunch (n=5). Schools with two lunch periods were the most likely to offer recess before lunch (n=32; AR= 2.6) compared to after lunch (n= 39). Schools with 2 lunch periods were also the most likely to schedule recess before lunch compared to schools with any other number of lunch periods (Table 14). Themes identified from schools that selected "Other" indicated they had 6-10 lunch periods, lunch periods that were determined by each individual class, staggered lunch periods, or continuous lunch periods.

Table 14. Adjust Residual of Number of Lunch Periods.

	N	Recess Before	Recess After
Number of Lunch Periods			
1	35	5	30
Row Percent		14.3%	85.7%
Adjusted Residual		-2.4	**2.4***
2	71	32	39
Row Percent		45.1%	54.9%
Adjusted Residual		**2.6***	-2.6
3	136	39	97
Row Percent		28.7%	71.3%
Adjusted Residual		-1.1	1.1
4	78	27	51
Row Percent		34.6%	65.4%
Adjusted Residual		0.5	-0.5
5	66	21	45
Row Percent		31.8%	68.2%
Adjusted Residual		-0.1	0.1

Summary

Results from this survey of elementary school principals in Indiana indicate a majority of schools still scheduled recess after lunch, despite the cited benefits for scheduling recess before lunch. Those schools that schedule recess before lunch indicated the greatest benefit experienced was an increased consumption of lunch. The greatest barrier schools encountered when implementing recess before lunch related to the revision of the daily schedule. The least encountered barrier was resistance from the food service staff. Feedback on scheduling recess before lunch was mostly positive or neutral from parents, staff, and students. Despite their practice, the majority of principals recommend scheduling recess before lunch. The least cited barrier was the increased need for communication between staff. The greatest perceived benefit of scheduling recess before lunch was the increased consumption of school lunch. The smallest perceived benefit was decreased lunch line wait time. The majority of schools scheduling recess after lunch stated they would consider scheduling recess before lunch and were unaware of the research surrounding a recess before lunch policy. There was no difference between when recess was scheduled by geographic location, school nutrition region, type of school, poverty level, or school enrollment. There was a significant difference between when recess was scheduled and the number of lunch periods offered during the school day. These results indicate that there is a need for an increased awareness of the benefits of scheduling recess before lunch and more aids in reducing the barriers that prevent the schedule change.

CHAPTER 5

DISCUSSION

The purpose of this study was to identify the practices, perceived benefits, and attitudes of elementary schools principles toward scheduling recess before lunch in Indiana. This chapter will present a discussion of the findings and the implications of the findings of this study. It will also compare the findings of similar studies previously discussed in chapter 2.

Summary of Findings

Through this survey it was found that approximately one-third (30.7%) of elementary schools in Indiana schedule recess before lunch. There was no difference in when recess was scheduled (before or after lunch) by the type of school, geographic location of the schools (rural, suburban, and urban), school nutrition region, poverty level as represented by the percent of students receiving free or reduced lunch, or by the number of students enrolled in the schools. There was, however, a significant difference when lunch and recess was scheduled compared to the number of lunch periods offered each day, with schools more likely to offer recess after lunch if there was just one lunch period.

The three most common barriers encountered by schools when implementing a recess before lunch policy involved having to revise the daily schedule, hand washing, and breaking with tradition of offering recess after lunch. The three most common barriers that prevented

schools from scheduling recess before lunch included their need to revise the daily schedule, preservation of academic hours, and lack of staffing. These results indicate revising the daily schedule is a major barrier in implementing a recess before lunch policy.

The three most cited benefits of scheduling recess before lunch included increased consumption of lunch, improved behavior in the cafeteria, and increased student focus on lunch. The benefits of a recess before lunch policy as described by those who schedule recess before lunch, and the *perceived* benefits of scheduling recess before lunch by those who do not schedule recess before lunch, were identical, with the three most cited perceived benefits cited by principals of schools that do not currently schedule recess before lunch being increased consumption of school lunch, increased focus on lunch, and improved behavior in the cafeteria.

Research touting the benefits of offering recess before lunch was the greatest influence that caused schools to change when they offered recess. Other influences associated with offering recess before lunch included maintaining a policy that was already in place when the principal started at the school, previous experience at other buildings, recommended by the school nurse, and that fact that it was a good fit for their school's schedule.

The results of this study indicate that most schools with a recess before lunch policy were aware of the research surrounding the topic or did not have to make any changes as the policy was already established and had support from faculty to implement the change. Most of the feedback from parents, staff, and students about the recess before lunch policy was positive or neutral; very little negative feedback was received by the principals. Most (82.1%) of the principals that currently schedule recess before lunch indicated they would recommend the schedule change to other schools. These results indicate that most recess before lunch policies have been a success.

More than half (53.4%) of schools that did not have a recess before lunch policy stated they were unaware of research on the topic of recess before lunch. The majority of schools (82.4%) that currently do not offer recess before lunch indicated they would consider changing to a recess before lunch schedule. These results indicate a need in increased awareness of the research of a recess before lunch policy and more information on how to tackle barriers to making the schedule change.

Prevalence of Recess Before Lunch

In a nationwide survey that focused on physical activity, Lee et al. (2007) reported that recess was regularly scheduled immediately *before* lunch for all classes in 10.4% of the 96.8% of schools that provided. The results of this survey indicate that, in Indiana, where the prevalence of recess before lunch in the state of Indiana was previously unknown, three times more elementary schools offered recess before lunch (30.7%) in the fall of 2017, at least for certain grade levels. In Missouri, 60% of schools and in Montana, 33% of schools have recess before lunch for all or some of their students (Missouri School Nurse Survey, 2016; U. S. Department of Agriculture, 2015).

Awareness of the body of research that supports implementing a recess before lunch policy could increase the prevalence of this practice in the state of Indiana. In this current study, in 53.4% of the schools that did not have a recess before lunch policy, the principals reported being unaware of research describing the benefits of recess before lunch. Bounds and Nettles (2008) found that one-third of the participants in their study that investigated the perception and practices of recess placement were not aware of the research describing the benefits of scheduling recess before lunch. Rainville, Lofton, and Carr (2009) suggest recess before lunch

could be promoted to school professionals if the benefits identified in studies were used as evidence for making this change. Organizations such as the Centers for Disease Control and Prevention (CDC), National Education Association (NEA), and the United States Department of Agriculture (USDA) all promote implementing recess before lunch (Centers for Disease Control, 2017; Fuller, 2017; U. S. Department of Agriculture, 2015). With the continued promotion by these organizations, and with an increasing body of evidence that supports the benefits associated with scheduling recess before lunch, the number of schools that adopt a recess before lunch policy should grow.

Benefits of Recess Before Lunch

The benefits described by principals who have implemented a recess before lunch policy, and the *perceived* benefits of this practice as indicated by principals who had not implemented a recess before lunch policy, were identical. Both groups either saw – or perceived – this practice to be associated with an increased consumption of lunch (i.e., reduced plate waste), improved behavior in the cafeteria, and an increased focus on consuming lunch.

The increased consumption of healthful foods was noted as a benefit of scheduling recess before lunch by only 13.6% of the principals in this study who scheduled recess before lunch; similarly, only 15.9% of the principals in this study who did *not* have a recess before lunch policy indicated that increased consumption of healthful foods was a *perceived* benefit of a recess before lunch policy. These results are supported by the findings of Fenton, Rosen, Wakimoto, Patterson, Goldstein, and Ritchie (2015) who, when comparing the consumption of foods by students who ate lunch before recess to those who ate lunch after recess, found no significant difference in the consumption of fruits or vegetables. Likewise, when Hunsberger et

al. (2014) compared the nutrients of meals consumed by students who had recess before lunch to those who had recess after lunch, no difference was found in the consumption of calories, iron, protein, vitamin C, or vitamin A between groups. Milk consumption, however, was 1.3oz greater in the recess before lunch group (5.7 oz vs. 4.4 oz); 20% more of the students in the recess before lunch group drank the entire carton of milk (42% vs. 25%, $p < 0.0001$), making the students in the intervention group 1.5 times more likely to meet the nutritional guidelines for calcium ($\geq$267 mg, $p = 0.01$) calcium. In 2004, the National Food Service Management Institute (Bergman et al., 2004) reported that, when fed lunch after recess compared to lunch before recess, elementary students ate 24% more food by weight, wasted 30% less food by weight, ate 8 percent more calories, consumed 35% more calcium, and consumed 13% more vitamin A. In sum, in light of the contradicting information about the impact of recess before lunch on the consumption of healthful nutrients, additional research is needed and, once determined, the information should be shared widely with key stakeholders so it can be used in their decision-making process.

The consumption of school meals is important as it promotes healthy growth and development of a student (Buzby & Guthrie, 2002a). This is especially important for students that live in a food insecure household. Many nutrients are related to proper development and performance of cognition. Iron, zinc, vitamin A, B vitamins, magnesium, vitamin D, pantothenic acid, and phosphorus have all shown some improvements in cognitive performance (Manger et al., 2004; Falkingham et al., 2010; Lozoff & Geogieff, 2006; Black, 2003; Gewa et al., 2009; Wang et al., 2008; Wang et al., 2017; The NEMO Study Group, 2007). School meals supported by the National School Lunch Program (NLSP) must provide 1/3 of the nutrients a student needs per day (Gunderson, 2017). The larger this consumption of this portion provided, the better off a

student will be, both developmentally and academically (Centers for Disease Control, 2014). As one of the benefits of scheduling recess before lunch is increased consumption of lunch, recess before lunch can ultimately improve the academic performance of students.

Another incentive to implement a recess before lunch policy is the possible reduction of plate waste. Plate waste is a large cost to a school's food service program with the estimated cost of $600 million to the economy (Buzby & Guthrie, 2002). There has been a lack of recent data on how much plate waste has cost the economy. In 2016, the NSLP cost the economy $13.6 billion (U. S. Department of Agriculture, 2016c). In 2014, a plate was study was performed where it was found that 79.8% of milk was wasted, 68.5% of vegetables were wasted, and 52.7% of fruits were wasted (Cohen et al, 2014). These percentages make up a large part of the meals provided through the NSLP, greatly costing the economy. Since that time, there have been major endeavors to decrease the amount of plate waste in schools.

The research related to the impact of scheduling recess before lunch on the amount of plate waste in a school system has been conflicting. Bergman et al. (2003) found that plate waste decreased from 40.1% to 27.2% when recess was scheduled before lunch. Strohbehn et al. (2016) found varying results in plate waste among three different schools. Tanka et al. (2005) and the Montana Office of Public Instruction (2003) found no significant difference in plate waste when comparing recess before lunch students to recess after lunch students, most often due to the small sample size of students in the studies. In the present study, although plate waste was not measured, the principals indicated a decrease in plate waste was a moderate benefit in both groups. In schools that had a recess before lunch policy, 26.5% of principals indicated decreased plate waste was a benefit, while 28.5% of the principals from schools that did not have a recess

before lunch policy indicated decreased plate waste as a perceived benefit of a recess before lunch policy.

Rainville et al. (2006) explored possible benefits and barriers to implementing a recess before lunch policy in a qualitative study. Most of the comments regarding the perceived benefits related to the potential benefits of decreased plate waste and increased consumption of school lunch. One additional benefit of a recess before lunch policy as identified by a focus group participant was that students would be able to resolve playground conflicts during lunch instead of during instructional time. These comments are similar to those obtained in the current study. Benefits identified in the current study by principals who schedule recess before lunch included the ease of transition and the logistics of the schedule preventing factors such as conflicts or unfinished work cutting into to recess or lunch instead of academic time.

Tanka et al. (2005) reported many benefits to scheduling recess before lunch in a 6th grade class, including decreased lunch line wait time and decreased discipline referrals. The results of the present study partially contradict these findings, as a decreased lunch line wait time was not perceived to be a benefit by principals from schools with a recess before lunch policy. The principals did, however, report improved behavior in the cafeteria as a major benefit resulting from a recess before lunch policy, with improved behavior on the playground only seen as a moderate benefit. Principals in the present study commented that recess before lunch was associated with decreased discipline problems, both at recess and in the lunchroom, and with students returning to the classroom more focused and ready to learn than when they had recess after lunch. The results of the present study support those of Hunsberger et al. (2014) wherein the teachers consistently reported that students were calmer during class when recess was scheduled before lunch. White (2003) also reported that students who participated in recess before lunch

had decreased complaints of stomach aches and a reduced number of nurse visits during recess. In the present study, many principals reported decreased visits to the nurse's office and decreased accounts of students vomiting on the playground. Based on these benefits alone, it would seem that scheduling recess before lunch would become the preferred policy, but still many schools have failed to adapt this schedule change.

Barriers to Recess Before Lunch

The most prevalent barriers that prevented schools in the current study from scheduling recess before lunch included issues related to revising the daily schedule, preserving the number of academic hours, and the lack of appropriate staffing. The most prevalent barriers that had to be overcome among those schools that do schedule recess before lunch included issues related to revising the daily schedule, hand washing, and the need to break with tradition. Both groups (principals of recess before lunch schools and principals of recess after lunch schools) indicated revising the daily schedule was a barrier – but it was a barrier that was able to be overcome by 30.7% of the schools in this survey. Interestingly, preservation of academic was a low-indicated barrier in the schools that schedule recess before lunch, but a top-indicated barrier in the schools that do not schedule recess before lunch. Many of the comments related to barriers associated with scheduling recess before lunch from principals in schools that have not made the schedule change included themes such as schedule revision, cafeteria design and space, and previous failed attempts. In contrast, the comments about barriers from principals who did schedule recess before lunch tended to be more technical in nature, such as students bringing in slush and mud during snowy and rainy weather and issues related to hand-washing.

Rainville et al. (2006) enumerated many barriers to scheduling recess before lunch. The results from this study were used, in part, to create the list of barriers included in the survey in the present study. These barriers included preservation of academic hours, supervision concerns, hand washing concerns, and concerns of breaking tradition. In the current study, in addition to the barriers identified by Rainville et al. (2006), many comments regarding barriers to scheduling recess before lunch related to preserving the time allotted to reading block periods.

Hunsberger et al. (2014) reported that scheduling recess before lunch caused students to have to wait at least 5 hours from the time they arrived at school before their scheduled lunch time. To avoid this barrier, several schools in the current study began offering breakfast to students while others allowed parents to send snacks with their students. One school stated they serve breakfast in the classroom starting at 9 AM and the first lunch period starts at 10:50 AM, giving some classes less than two hours between meals for instructional time. Therefore, providing schools breakfast may help or hinder the scheduling of lunch before recess. Another scheduling barrier mentioned by Hunsberger et al. (2014) occurred when students had recess, lunch, and physical education in a row. This was physically taxing on this group of students. Comments in the present study confirm that scheduling is difficult, especially when the playground and cafeteria are used for multiple grade levels, making it difficult, if not impossible, to change the schedule. One principal mentioned that they use the same space for lunch and physical education class, causing them to have increased scheduling concerns. Other scheduling concerns included lunch periods only being offered at certain times of the day and the working hours of the cafeteria staff if the school offers both breakfast and lunch.

In sum, results from the current study clearly indicate that scheduling and revision of the daily schedule are seen as tremendous barriers when it comes to scheduling recess before lunch.

One principal mentioned that lunch periods were only offered during certain periods of the day and another principal mentioned only having a small window of time to serve lunch. Another aspect not specifically mentioned by participants in this study, but certainly an important aspect, is that school participating in the National School Lunch Program must schedule lunch between the hours of 10 AM and 2 PM. This is a large 4 hour window, but larger schools may need to use every minute to their advantage.

Feedback about Scheduling Recess Before Lunch

In general, the feedback received by the principals from parents, students and staff regarding offering recess before lunch was either positive or neutral in tone. Parents and students were primarily neutral in their feedback (i.e., it didn't matter one way or the other), while the feedback from the staff was mostly positive. In a similar study, Bounds and Nettles (2008) also found the feedback from school staff to be mostly positive. In contrast to the present study, however, these researchers reported more positive feedback from parents and students than the feedback gathered in the current study. In both the current study and that of Bounds and Nettles (2008), the vast majority of principals were extremely positive about recommending the schedule change to other schools.

Support in Implementing a Recess Before Lunch Policy

Principals who schedule recess before lunch were asked to identify factors that influenced them when the decision was made to implement this schedule change. The greatest influencer was research on the topic of recess before lunch. This indicates that those principals that had a

recess before lunch policy were aware of the research surrounding the benefits. An increase in awareness of the benefits of recess before lunch could increase this practice.

An elementary school in the Salt Lake City School District has included information about scheduling recess before lunch in their school improvement plan, including the importance of structuring the schedule to ensure that students are not pressured to "eat and run" as they would if recess was scheduled immediately after lunch (Salt Lake City School District, 2014). Other procedures included in this improvement plan include providing more serving lines to ensure students spend less time in lunch lines and more time eating. Including practices such as recess before lunch in a school improvement plan or a policy and procedures manual can help increase awareness of the practice to staff and increase the seriousness of the need to implement a recess before lunch policy.

In 2009, a draft of an evidence-based "best practice" checklist was developed by a panel of school nutrition directors, principals, and state agency personnel for the National School Lunch Program (Rainville et al., 2009). This drafted checklist was created to ensure certain aspects of implementing a recess before lunch policy are addressed, including pilot testing the policy to address issues, adequate time to pilot the policy, ensure meal service to students is timely and efficient, ensure positive communication with students and staff during implementation, ensure continued cooperation with food service and recess before lunch staff, and ensure staff assists with supervision of recess and lunch periods (Rainville et al., 2009). The items on this checklist are similar to comments received by the principals in the present study, including comments about staff buy-in, communication, and the need to swiftly address issues as they arise, when they were asked if they had any advice to implementing a recess before lunch policy.

The “success stories” reported by the principals in the present study also reflect the suggestions included on the NSL’s “best practice” checklist, including anecdotes about the importance of communicating well with staff, the importance of having an attitude of “the schedule works for us; we do not work for the schedule,” and addressing issues as they arose. A few principals, for example, mentioned installing hand sanitizer dispensers outside of the cafeteria that students could use as they entered the cafeteria from the playground. Another principal mentioned rewarding students who lined up quickly and quietly for lunch to lead the line to the cafeteria for an easier transition from the playground to the cafeteria.

The Oklahoma Department of Education has prepared a brochure, funded with Federal funds from the USDA-Food and Nutrition Service, which touts the research-related benefits of recess before lunch (http://sde.ok.gov/sde/sites/ok.gov.sde/files/CN-RecessBeforeLunch.pdf). Another widely available Fact Sheet about research-based benefits of recess before lunch (https://www.peacefulplaygrounds.com/download/lunch/benefits-recess-before-lunch-facts.pdf) has been published by a group called Peaceful Playgrounds. This five page brochure includes solutions for common concerns, documented outcomes, contacts for schools that are willing to share resources and advice (including Forest Glen international Elementary School in Indianapolis), and a list of peer-reviewed references. Lastly, Action for Healthy Kids has a web-based toolkit that can be used to help schools implement a recess before school policy (http://www.actionforhealthykids.org/tools-for-schools/find-challenges/cafeteria-challenges/1232-recess-before-lunch). These teacher-friendly resources and the NSL checklist should be shared by university Teacher Education programs and Departments of Education across the county in an effort to make current and future teachers and school administrators aware of the benefits of recess before lunch.

Differences That May Affect the Scheduling of Recess and Lunch

Indiana is divided into 9 different nutrition regions for the purpose of promoting networking opportunities, training, and meetings of chapters in each school nutrition region. Each of the region may have differing nutrition goals. In addition, different characteristics of schools (i.e., geographic location, private versus public, economic level) have been shown to influence school health-related policies. For example, Catholic, private, and smaller schools commonly have more lenient health policies than those of larger public schools (Balaji et al., 2006). Caspi et al. (2015) , in a study performed between 2008 and 2012, found that healthy eating practices declined in city schools but remained constant in rural and town schools. In the current study, there were no differences found in the scheduling of lunch and recess of the type of school (public or private), the geographical location of the school (rural, suburban, or urban), Indiana School Nutrition Region, poverty level (low, mid-low, mid-high, and high), or school enrollment. These results contradict the findings of O'Leary, Stendell-Hollis, Beeson, and Ogan (2017) who found that schools with a low enrollment were least likely to schedule recess before lunch and those that had implemented recess before lunch had the highest enrollments in the study. Although these characteristics may affect the health policies of a school, the current study shows that these factors do not affect whether or not a school would schedule lunch before recess.

In the present study, however, there were significant differences when lunch and recess was scheduled by the number of lunch periods offered in a school, with schools having only one lunch period significantly more likely to offer recess after lunch than schools with three or more lunch periods, and those schools with two lunch periods significantly more likely to offer recess before lunch than schools with any other number of lunch periods. Many of the barriers mentioned by principals included the complication of scheduling around other grade's lunch

periods and can become more complicated the as the number of grades sharing the cafeteria increases. One principal specifically mentioned that they share the cafeteria with the middle school and must work around their schedule. More lunch periods call for more class periods to schedule around, making it more difficult to implement the recess before lunch policy.

Summary

There are many benefits to scheduling recess before lunch. The most popular benefits indicated from this study are increased consumption of lunch, improved behavior in the cafeteria, and increased focus on consuming lunch. Both schools that have recess before lunch and those who do not considered these benefits to the schedule change. The benefits found in this study support those found in many previous studies. Yet, with all the mentioned benefits, more than two-thirds of the schools in Indiana have not yet adapted the policy. The biggest barriers to scheduling recess before lunch in Indiana were the need to revise the daily schedule, the need to preserve academic hours, and the lack of staffing for supervision in the cafeteria and on the playground. These barriers to scheduling recess before lunch support the results of previous research. The current study brought to light many remedies to these barriers. As the remedies and benefits become better known to more schools, the more the policy can be adapted, and other students will be able to reap the many benefits of scheduling recess before lunch.

CHAPTER 6

CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

The purpose of this study was to identify the practices, perceived benefits, and attitudes of elementary school's principals toward scheduling recess before lunch in Indiana. This chapter will present the conclusions, limitations, and future research on the topic of recess before lunch.

Conclusions

Organizations such as the CDC and the USDA and recommended that schools schedule lunch before recess to help decrease the amount of plate waste in schools (Centers for Disease Control, 2017; U. S. Department of Agriculture, 2015). Other than decreased plate waste, many other benefits have been found when making the schedule change such as improved benefits in the cafeteria and on the playground, improved attentiveness during class, and increased time to consume lunch. Yet, with all the discovered benefits, many schools have not adapted the schedule change.

One of the main goals of this research study was to uncover the prevalence of scheduling recess before lunch in elementary schools in the state of Indiana. While it was found that the majority of schools continue to schedule recess in the traditional pattern after lunch in Indiana (69.3%), almost three out of every ten schools (30.7%) scheduled recess before lunch in the fall of 2017.

This study proceeded to investigate the benefits and barriers of scheduling recess before lunch. For schools that did not schedule recess before lunch, the biggest barriers included the need to revise the daily schedule and the need to preserve academic hours. Comments regarding barriers to implementing recess before lunch included: never considering it, past failed attempts of a recess before lunch policy, and scheduling difficulties. The most common perceived benefit of scheduling recess before lunch included an increased consumption of lunch (i.e., decreased plate waste), an increased focus on consuming lunch, and improved behavior in the cafeteria. More than half of the principals stated they were unaware of the research surrounding benefits associated with scheduling recess before lunch. Many of these schools indicated they would consider scheduling recess before lunch in the future.

In schools that did schedule recess before lunch, the greatest barriers they encountered included the need to revise the daily schedule, hand washing, and breaking of tradition. Many of the principals stated they did not encountered barriers because the recess before lunch policy was already in place when they became principal.

The actual benefits associated with scheduling recess before lunch before lunch were almost identical to the perceived benefits indicated by principals who do not schedule recess before lunch. This observation indicate that the perceived benefits of recess before lunch can become a reality with the schedule change. The benefits and barrier reported in this study support the results of many previous studies conducted to investigate the effects of scheduling recess before lunch (Rainville, Wolf, & Carr, 2006; Hunsberger et al., 2014; Fenton et al., 2015; Bergman et al., 2003; Tanka et al., 2005; Stohbehn et al., 2016).

In the present study, the schools that schedule recess before lunch indicated the greatest influence causing them to make this schedule shift was research on the topic. This result

indicates that research and awareness of the topic is a critical factor in promoting a recess before lunch policy. The more principals and school faculty that are knowledgeable about this topic, the more prevalent the practice will become.

The principals in the present study indicated that the feedback they received from parents, students, and staff about scheduling recess before lunch was mostly positive to neutral; few principals reported receiving any negative feedback from parents, students or staff. Almost every principals that schedules recess before lunch indicated they would recommend this policy to other schools, providing further evidence of the positive effects associated with implementing a recess before lunch policy.

Another important finding from this study relates to when schools scheduled recess based on school-related characteristics. No differences were found between when recess was scheduled by geographic location, school nutrition region, type of school (public or private), estimated poverty level, or total enrollment. These factors were investigated based on evidence from previous studies that had indicated smaller, private schools tend to have more strict health policies (Balaji, Brener, & McManus, 2006), variations of health practices based on geographical location (Caspi et al., 2015), and the percentage of students on free or reduced price lunch and variations in the consumption of school lunch (Stookey, 2015). The results of the present study contradict the results of these studies, as none of these factors appeared to have played a role in determining when recess was scheduled.

Significant differences were found between the number of lunch periods offered and when recess was scheduled before lunch, with schools having only one lunch period much more likely to follow the traditional pattern and schedule recess after lunch. An increased number of lunch periods complicates the process of the revisions of schedules, especially when a schools

has a smaller cafeteria or playground that can only hold students to a certain capacity. This was also a comment frequently received from principals in the current study.

As more research on recess before lunch emerges, more schools and organizations have been providing tips and tricks for other schools to be able to adopt the policy. With increased awareness of the benefits and the remedies to the barriers, more schools will be able to experience decreased plate waste, improved behavior on the playground and in the cafeteria, improved attentiveness in class, and many more barriers that coincide with the implementation of a recess before lunch policy. Both recess and lunch are an important part of the school day. Recess before lunch can help exemplify the benefits from consuming school lunch and participating in school recess.

Strengths and Limitations of the Study

The primary strength to this study is the large sample size. This study was able to reach many of the elementary school principals in the state of Indiana to collect their opinions on scheduling recess before lunch. Another strength is the even distribution of geographical locations and the Indiana School Nutrition Regions. This helps validate the study by showing that responses were not collected from just one area of Indiana. One additional strength of this study was the survey instrument. The instrument, created from existing recess before lunch surveys, was validated by nutrition and education professionals, and tested for reliability by distributing it to principals outside the targeted population. The survey showed a high reliability as the initial principals' responses matched those recorded during the second time they completed the instrument. These factors show that the survey is able to collect valid and reliable results from elementary school principals.

A limitation to this study is that it may not accurately describe the prevalence of recess before lunch in the state of Indiana. While analyzing the data collected, it was discovered that some of the elementary schools that indicated they did not schedule recess before lunch actually scheduled recess before lunch from some, but not all, grades. This limitation could be alleviated by adding a third option, "Both before and after lunch" to the question "When does your school schedule recess?". Another limitation to this study refers to the question of how many lunch periods are offered at the school. This question allowed principals to pick from 6 options of number of lunch periods with the sixth option being "Other." Many of the principals chose the "Other" option. To receive the true number of lunch periods offered, it would be more beneficial to make this an open-ended question.

Future Recommendations

The results from this study elicit further research. The following suggestions are recommended based on the results of this study:

- Performing intervention studies and piloting some of the strategies to implement a recess before lunch policy would be beneficial to find the best way to alleviate barriers to scheduling recess before lunch.
- The present study did not ask whether the school participated in the National School Lunch Program. It would also be beneficial to study the differences in barriers and implementation of recess before lunch between schools participating in the NSLP and those who do not participate. This research would indicate if the NSLP plays a role in preventing or promoting the use of recess before lunch.

- A study involving schools that schedule both recess before lunch and recess after lunch for different classes would also be beneficial. These schools could have better insight to the real benefits of scheduling recess before lunch compared to after.
- The current study is only relevant to the state of Indiana and only represents a small portion of schools in the United States. A nationwide survey would help in finding the prevalence of recess before lunch nationwide.

Summary

This study aimed to identify the prevalence of recess before lunch in Indiana and the benefits and barriers to the schedule change. Only a minority (30.7%) of elementary schools in Indiana reported scheduling recess before lunch. From this study, barriers and benefits were identified. Benefits included increased consumption of school lunch, improved behavior in the cafeteria, and an increased focus on lunch. The most common barriers included revision of the daily schedule, preservation of academic hours, and other barriers not listed. The most common barriers encountered when scheduling recess before lunch included revision of the daily schedule, hand washing, and breaking of tradition. Most of the schools that do not schedule recess before lunch stated they were not aware of the research surrounding the topic. School nutrition region, geographic location, enrollment, and poverty level did not influence whether a school scheduled recess before lunch, while the number of lunch periods offered did influence whether a school scheduled recess before lunch. Increased awareness and promotion of a recess before lunch policy will increase the prevalence and thus increase the benefits from school lunch and school recess.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD MATERIALS

CITI CERTIFICATE OF COMPLETION

Appendix A-1 Institutional Review Board Submission

Office of Research Integrity
Institutional Review Board (IRB)
2000 University Avenue
Muncie, IN 47306-0155
Phone: 765-285-5070

DATE:	June 23, 2017
TO:	Hannah Green, BS
FROM:	Ball State University IRB
RE:	IRB protocol # 1065947-1
TITLE:	ATTITUDES TOWARD, PERCEIVED BENEFITS, AND PREVALENCE OF SCHEDULING RECESS BEFORE LUNCH: A SURVEY OF INDIANA ELEMENTARY SCHOOL PRINCIPALS
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
DECISION DATE:	June 23, 2017
REVIEW TYPE:	**EXEMPT**

The Institutional Review Board reviewed your protocol on June 23, 2017 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

Exempt Categories:

	Category 1: Research conducted in established or commonly accepted educational settings, involving normal educations practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
X	**Category 2**: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior
	Category 3: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under category 2, if: (i) the human subjects are elected or appointed officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
	Category 4: Research involving the collection of study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or

	if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.
	Category 5: Research and demonstration projects which are conducted by or subject to the approval of Department or agency heads, and which are designed to study, evaluate or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in methods or levels of payment for benefits or services under these programs.
	Category 6: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed which contains a food ingredient at or below the level and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Editorial Notes:

1. N/A

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact (ORI Staff) if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (http://www.bsu.edu/irb) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Reminder: Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.

Bryan Byers, PhD/Chair
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/Director
Office of Research Integrity

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Hannah Green (ID: 6108825)
- **Institution Affiliation:** Ball State University (ID: 1568)
- **Institution Email:** hcgreen@bsu.edu
- **Institution Unit:** Nutrition and Dietetics
- **Phone:** 4193662599

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 22115727
- **Report Date:** 13-Feb-2017
- **Current Score**:** 82

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID: 1321)	11-Feb-2017	5/5 (100%)
Ball State University (ID: 13475)	10-Feb-2017	No Quiz
History and Ethical Principles - SBE (ID: 490)	11-Feb-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	11-Feb-2017	4/5 (80%)
Belmont Report and CITI Course Introduction (ID: 1127)	10-Feb-2017	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	13-Feb-2017	5/5 (100%)
Assessing Risk - SBE (ID: 503)	13-Feb-2017	4/5 (80%)
Informed Consent - SBE (ID: 504)	12-Feb-2017	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	13-Feb-2017	3/5 (60%)
Research with Prisoners - SBE (ID: 506)	13-Feb-2017	4/5 (80%)
Research with Children - SBE (ID: 507)	13-Feb-2017	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	13-Feb-2017	5/5 (100%)
International Research - SBE (ID: 509)	13-Feb-2017	3/5 (60%)
Internet-Based Research - SBE (ID: 510)	13-Feb-2017	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	13-Feb-2017	3/5 (60%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	13-Feb-2017	3/4 (75%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	13-Feb-2017	3/5 (60%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	13-Feb-2017	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k78f7e421-1f9d-4b33-9a62-9755a8bf1d56-22115727

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

APPENDIX B

SURVEY INSTRUMENT

Appendix B – Survey Instrument

Q1 DIRECTIONS: Use your cursor to select your answers to each question. Move to the next question by clicking the "NEXT" button in the bottom right hand corner of the screen. Some questions ask you to select "all that apply" -- just keep clicking!

If you have any questions about the survey, please email Hannah Green at hcgreen@bsu.edu.

Thank you for completing this survey!

Q2 What is your current position?

- ❍ Principal (1)
- ❍ Assistant Principal (2)

Q3 Approximately how many students are enrolled in your (elementary) school?

_____

Q4 What percentage of students are on free or reduced lunch?

_____

Q5 How many lunch periods does your school offer per day?

- ❍ 1 (1)
- ❍ 2 (2)
- ❍ 3 (3)
- ❍ 4 (4)
- ❍ 5 (5)
- ❍ Other (please indicate) (6) _____

Q6 When is recess currently scheduled at your school?

- ❍ BEFORE Lunch (1)
- ❍ AFTER Lunch (2)

Skip To: Q15 If When is recess currently scheduled at your school? = AFTER Lunch

Q7 Approximately how long has your school scheduled recess *before* lunch?

- ❍ 1 year (1)
- ❍ 2 years (2)
- ❍ 3 years (3)
- ❍ 4 years (4)
- ❍ 5 years or more (5)
- ❍ I am not sure (6)

Q8 Do ALL grades have recess *before* lunch?

- ❍ Yes (1)
- ❍ No (2)

Skip To: Q10 If Do ALL grades have recess before lunch? = Yes

---

Q9 What grades have recess *before* lunch? (Select all that apply)

- ☐ Kindergarten (1)
- ☐ 1st Grade (2)
- ☐ 2nd Grade (3)
- ☐ 3rd Grade (4)
- ☐ 4th Grade (5)
- ☐ 5th Grade (6)
- ☐ 6th Grade (7)

Q10 Many factors in the school environment influence student behavior and performance.

In your opinion, which of these behaviors and/or performance measures are associated with scheduling recess BEFORE lunch? (Select all that apply)

- [ ] None, I do not see any benefits in scheduling recess before lunch (1)
- [ ] Improved student behavior in the cafeteria (2)
- [ ] Improved student behavior on the playground (3)
- [ ] Increased consumption of school lunch (4)
- [ ] Increased consumption of healthful foods (i.e., repeated trips through the salad bar or drinking more milk). (5)
- [ ] Students focus more on consuming lunch (6)
- [ ] Decreased plate waste (7)
- [ ] Students have more time to consume their lunch (8)
- [ ] Decreased student lunch line wait time (9)
- [ ] Students are more attentive during class (10)
- [ ] Other (Please specify) (11) _____

Q11 What factors influenced the decision to adopt a recess *before* lunch policy at your school? (Select all that apply)

- ☐ Recommended by parents (1)
- ☐ Recommended faculty or staff (2)
- ☐ Recommended by School Board or School Commission (3)
- ☐ Research on the topic (4)
- ☐ The policy was in place when I became principal (7)
- ☐ Unsure (6)
- ☐ Other (5) _____

Q12 Which of these barriers, if any, did you encounter during implementation of your recess *before* lunch policy? (Select all that apply)

- ☐ None, the school scheduled recess before lunch before I became principal (1)
- ☐ Lack of staffing for student supervision (2)
- ☐ Breaking of tradition (3)
- ☐ Increased need for communication between school staff (4)
- ☐ Increased length of time between breakfast at home and lunch time (5)
- ☐ Decreased time for hand washing (6)
- ☐ Preservation of academic hours (7)
- ☐ Time for students to get coats during cold weather (8)
- ☐ Resistance by teachers and faculty (9)
- ☐ Resistance by nutrition and food service staff (10)
- ☐ Resistance by parents (11)
- ☐ Inadequate space to hold groups of students in lunchroom or playground (12)
- ☐ Revision of daily schedule (13)
- ☐ Other (Please specify) (14) _____

Skip To: Q29 If Which of these barriers, if any, did you encounter during implementation of your recess before lu... != None, the school scheduled recess before lunch before I became principal

Q13 Would you be willing to share a success story about how you removed the barriers preventing you from starting your recess before lunch policy?

_____

Q14 How would you categorize the feedback you received after the recess before lunch policy was implemented?

	Negative (1)	Neutral (2)	Positive (3)
Feedback from Parents (1)	❍	❍	❍
Feedback from School Staff (2)	❍	❍	❍
Feedback from Students (3)	❍	❍	❍

Q15 Would you recommend scheduling recess before lunch to other schools?

- ❍ Yes (1)
- ❍ No (2)

Q16 Would you like to share any advice with other schools that may be considering implementing a recess *before* lunch policy?

- ❍ No (1)
- ❍ Yes (2) _____

Skip To: Q19 If Would you like to share any advice with other schools that may be considering implementing a rece... = No
Skip To: Q19 If Would you like to share any advice with other schools that may be considering implementing a rece... = Yes

Q17 Would you ever consider scheduling recess *before* lunch?

- ❍ Yes (1)
- ❍ No (2)

Q18 Which of the following barriers prevent you from scheduling recess *before* lunch? (Check all that apply)

- ☐ None of these apply; we haven't discussed a recess before lunch policy (1)
- ☐ Unaware of information to make a decision about a recess before lunch policy (2)
- ☐ Lack of staffing for student supervision (3)
- ☐ Breaking of tradition (4)
- ☐ Increased need for communication between school staff (5)
- ☐ Increased length of time between breakfast at home and lunch time (6)
- ☐ Decreased time for hand washing (7)
- ☐ Preservation of academic hours (8)
- ☐ Time for students to get coats during cold weather (9)
- ☐ Resistance by nutrition and food service staff (10)
- ☐ Resistance by parents (11)
- ☐ Inadequate space to hold groups of students in lunch room or playground (12)
- ☐ Revision of daily schedule (13)
- ☐ Other (Please specify) (14) _____

Q19 What do you think are some of the benefits of scheduling recess *before* lunch? (Check all that apply)

- ☐ None, I do not see any benefits in scheduling recess before lunch (1)
- ☐ Improved student behavior on the playground (2)
- ☐ Improved student behavior in the cafeteria (3)
- ☐ Increased consumption of school lunch (4)
- ☐ Increased consumption of healthful foods (i.e., repeated trips through the salad bar, increased consumption of milk) (5)
- ☐ Students focus more on consuming lunch (6)
- ☐ Decreased plate waste (7)
- ☐ Students have more time to consume their lunch (8)
- ☐ Decreased student lunch line wait time (9)
- ☐ Students are more attentive during class (10)
- ☐ Other (Please specify) (11) _____

Q20 Were you aware of research regarding the scheduling of recess placement in elementary schools prior to receiving this survey?

- ❍ Yes (1)
- ❍ No (2)

Q21 Is your school:

- ❍ Public (1)
- ❍ Private (2)
- ❍ Other (Please specify) (3) _____

Q22 What is your gender?

- ❍ Male (1)
- ❍ Female (2)

Q23 I have been a principal at this school for _____ year(s).

▼ 1 (1) ... 50 (50)

Q24 In your career, how many years have you been a principal?

▼ 1 (1) ... 50 (50)

Q25 How would you describe the area where your school is located?

- ❍ Urban (1)
- ❍ Suburban (2)
- ❍ Rural (3)

Q26 The map BELOW depicts the 9 Indiana School Nutrition Regions. Click the drop down box to indicate the School Nutrition Region in which your school is located. (Note: You might have to scroll down to see the NEXT button).

▼ 1 (1) ... 9 (9)

APPENDIX C

LETTERS OF PERMISSION AND CONSENT

C-1 Letter of Permission from Action for Healthy Kids Indiana

C-2 Letter of Permission from Indiana Association of School Principals

Appendix C-1 – Letter of Permission from Action for Healthy Kids Indiana

June 2, 2017

Carol A. Friesen, PhD, RDN, CD
Professor of Nutrition and Director of Graduate Studies
Department of Nutrition and Health Science
CL 326G
Ball State University
Muncie, IN 47306

Dear Professor Friesen:

Action for Healthy Kids® fights childhood obesity, undernourishment and physical inactivity by helping schools become healthier places so kids can live healthier lives. We partner with a legion of dedicated volunteers -- teachers, students, moms, dads, school wellness experts and more -- from within the ranks of our 120,000+ network to create healthful school changes. After all, *everyone* has a part to play in ending the nation's childhood obesity epidemic.

The Indiana AFHK state team collaborates with schools, districts and other community partners to engage volunteers in school wellness activities. We give grants to schools to implement alternative breakfast programs, school gardens, nutrition education, physical activity programs and other healthy school practices.

Indiana Action for Healthy Kids is thrilled to support Hannah Green's thesis proposal that examines the impact of the placement of lunch and recess (i.e., recess before lunch versus recess after lunch) in Indiana. We are willing to communicate and distribute the survey, including placing the survey link on our Indiana AFHK website and in our summer and fall newsletters that are distributed to thousands of school professionals in the state.

We are happy to support this work and look forward to learning the conclusions of your thesis proposal.

Hannah J. Ramsland

Indiana Action for Healthy Kids - 1214 West Sunset Lane - West Lafayette, Indiana 47906

Appendix C-2 – Letter of Permission from Indiana Association of School Principals

Friesen, Carol

From: Todd Bess <TBess@iasp.org>
Sent: Monday, June 05, 2017 1:56 PM
To: Friesen, Carol
Cc: Green, Hannah Catherine
Subject: RE: Request for Assistance

We are glad to provide assistance and support for this survey and study. We will send out the survey link and short description to your desired audience through our database. Let us know the final timing and we hope the study goes well.

Thanks. Todd

Dr. Todd Bess, Executive Director
Indiana Association of School Principals
317-947-4116 – Office
317-495-5149 – Mobile

APPENDIX D

SURVEY EMAILS

Appendix D-1 – Initial Email

Appendix D-2 – Second Wave Email

Appendix D-3 – Action for Healthy Kids Newsletter Blurb

Appendix D-1 – Initial Email

Dr. Carol Friesen
3192 W. Sharon Drive
Greenfield

Dear Dr. Friesen,

The Indiana Association of School Principals is collaborating with Hannah Green, a graduate student in the Department of Nutrition and Health Science at Ball State University, to conduct a brief, anonymous survey to identify the practices, perceived benefits, and attitudes of elementary school principals towards scheduling recess before lunch in Indiana.

I would truly appreciate just a few moments of your time.

Please click this *link* to connect to our survey.

Thank you!

Sincerely,

Dr. James Stroud
Associate Dean of Teachers College
Ball State University
Muncie, IN 47306
Office: 765-285-3313
jstroud@bsu.edu

1

Appendix D-2 – Second Wave Email

Carol Friesen
Ball State University

Dear Dr. Friesen,

Approximately ten days ago, I sent you a link to a brief, anonymous survey that examines the practices, benefits, and attitudes of elementary school principals toward the scheduling of recess and lunch in Indiana.

We are pleased so many of you have already responded! Thank you!

If you did not complete the survey, we would like to give you one last opportunity! Simply click or copy this link: https://bsu.qualtrics.com/jfe/form/SV_3DcCcNfU9dpcJgN

The survey, approved by the Ball State University IRB, is a collaborative effort between The Indiana Association of School Principals and Hannah Green, a graduate student in Nutrition and Dietetics at Ball State University. Hannah's thesis committee --her major professor, Dr. Carol Friesen, Dr. Teresia Mbogori, and myself –appreciate your time!

Sincerely,

Dr. James Stroud
Professor of Elementary Education
Ball State University
Muncie, IN 47306
Office: 765-285-3313
jstroud@bsu.edu

Appendix D-3 – Action for Healthy Kids Newsletter Blurb

Recess and Lunch in Indiana Elementary Schools

Your help is needed! To examine current practices in Indiana, a Ball State University graduate student – with the assistance of Dr. Jim Stroud, Associate Dean of the Ball State Teacher's College, and the support of Action for Health Kids – is conducting a study to identify practices, perceived benefits, and attitudes of Indiana elementary school principals about scheduling recess and lunch. Will you help?

The short (< 5 minutes) survey is **anonymous**. The only identifying information collected includes the type of school (public, private, other), the type of area where your school is located (urban, suburban, or rural), the school nutrition region (map provided), and the percent of students who receive free or reduced lunch at your school.

To access the survey, please click this *link*. Thank you for your help!